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1991

EPA Superfund
Record of Decision:

ARLINGTON BLENDING & PACKAGING
EPA ID: TND980468557
OU 00
ARLINGTON, TN
06/28/1991

Text:

DESCRIPTION OF THE CONTINGENCY REMEDY

* EXCAVATION OF APPROXIMATELY 24,000 CUBIC YARDS OF CONTAMINATED SOIL;

* DECONTAMINATION OF CONTAMINATED SOIL USING ON-SITE THERMAL DESTRUCTION TREATMENT;

* PLACEMENT OF THE THERMALLY TREATED SOIL INTO THE EXCAVATED AREAS;

* ACTIVATED CARBON TREATMENT OF THE CONTAMINATED GROUNDWATER ON-SITE AND SURFACE WATER DISCHARGE OF THE TREATED EFFLUENT;

* ON-SITE SOLIDIFICATION OF SOILS CONTAINING LEVELS OF ARSENIC AND/OR OTHER TRACE METALS ABOVE CLEANUP LEVELS FOR OFF-SITE DISPOSAL:

#SD
STATUTORY DETERMINATIONS

THE SELECTED REMEDY IS PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, COMPLIES WITH FEDERAL AND STATE REQUIREMENTS THAT ARE LEGALLY APPLICABLE OR RELEVANT AND APPROPRIATE TO THE REMEDIAL ACTION (OR "A WAIVER CAN BE JUSTIFIED FOR WHATEVER FEDERAL AND STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENT THAT WILL NOT BE MET"), AND IS COST-EFFECTIVE. THIS REMEDY UTILIZES PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT (OR RESOURCE RECOVERY) TECHNOLOGY TO THE MAXIMUM EXTENT PRACTICABLE, AND SATISFIES THE STATUTORY PREFERENCE FOR REMEDIES THAT EMPLOY TREATMENT THAT REDUCES TOXICITY, MOBILITY, OR VOLUME AS A PRINCIPAL ELEMENT."

BECAUSE THIS REMEDY WILL RESULT IN HAZARDOUS SUBSTANCES REMAINING ON-SITE ABOVE HEALTH-BASED LEVELS, A REVIEW WILL BE CONDUCTED WITHIN FIVE YEARS AFTER COMMENCEMENT OF THE REMEDIAL ACTION TO ENSURE THAT THE REMEDY CONTINUES TO PROVIDE ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT. A 5-YEAR REVIEW (OR PERFORMANCE EVALUATION) WILL BE PREPARED AT LEAST ONCE EVERY FIVE YEARS UNTIL GROUNDWATER CONTAMINANT CONCENTRATIONS NO LONGER EXCEED HEALTH-BASED LEVELS.

GREER C. TIDWELL DATE: 06/28/91
REGIONAL ADMINISTRATOR

#SNLD

SITE NAME, LOCATION, AND DESCRIPTION

THE ARLINGTON BLENDING & PACKAGING SITE (SITE OR ABAP) IS LOCATED APPROXIMATELY 25 MILES NORTHEAST OF MEMPHIS, TENNESSEE AT 12121 US HIGHWAY 70 IN THE TOWN OF ARLINGTON, SHELBY COUNTY, TENNESSEE (FIGURE 1.1). IT IS BORDERED ON THE WEST BY A TENNESSEE DEPARTMENT OF TRANSPORTATION (DOT) FACILITY, ON THE EAST BY A RESIDENTIAL HOUSING DEVELOPMENT, ON THE NORTH BY A LARGE TRACT OF LAND CURRENTLY USED AS A SOD FARM, AND THE SOUTH BY CSX RAILROAD TRACKS AND FURTHER SOUTH BY A COTTON FIELD. THE LARGE TRACTS OF LAND LOCATED DIRECTLY NORTH AND SOUTH OF THE ABAP PROPERTY ARE CURRENTLY USED FOR AGRICULTURAL PURPOSES. THE NEARBY LOOSAHATCHIE RIVER CANAL IS LOCATED APPROXIMATELY 3000 FEET DUE NORTH OF THE SITE.

THE SITE IS THE FORMER LOCATION OF THE ARLINGTON BLENDING & PACKAGING COMPANY (ABAP). THE RELATIVELY FLAT 2.3 ACRE SITE IS COVERED PRIMARILY WITH PATCHY WEEDS AND A GRAVEL, SANDY TOPSOIL, AND FILL COVER. ALL THAT REMAINS OF THE NOW ABANDONED FACILITY, WHERE PESTICIDES, HERBICIDES, AND OTHER TYPES OF CHEMICALS WERE FORMULATED AND PACKAGED, ARE THREE (3) QUONSET HUTS (AND A WAREHOUSE) LOCATED AT THE REAR OF THE PROPERTY. THE CONCRETE FLOORED BUILDINGS ARE ABANDONED AND IN DISREPAIR. LOCATED AT THE FRONT OF THE PROPERTY IS A SMALL LABORATORY THAT IS CURRENTLY OPERATED BY HELENA CHEMICAL, A CHEMICAL MANUFACTURING FIRM (FIGURE 1.2).

THE POPULATION OF THE TOWN OF ARLINGTON, TENNESSEE IS APPROXIMATELY 1800. THOSE IN CLOSEST PROXIMITY TO THE SITE ARE THE RESIDENTS OF THE MARY ALICE DRIVE SUB-DIVISION (MADSD) AND THE EMPLOYEES OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION AND HELENA CHEMICAL LABORATORY. THE MADSD IS COMPRISED OF FORTY-FOUR (44) HOMES. MANY OF THE HOMEOWNERS HAVE SCHOOL AGED CHILDREN.

TOPOGRAPHY IN THE AREA VARIES FROM RELATIVELY FLAT, IN THE VICINITY OF ARLINGTON, TO GENTLY ROLLING TO RATHER STEEP. THE LAND SURFACE IS TOPPED MAINLY BY PLEISTOCENE LOESS, EXCEPT THOSE IN FLOOD PLAIN LOCATIONS WHERE ALLUVIAL DEPOSITS ARE PREVALENT.

SITE-SPECIFIC GEOLOGICAL AND STRATIGRAPHIC INFORMATION WAS DEVELOPED DURING THE MONITORING WELL CONSTRUCTION AND DURING AN ELECTRIC PIEZOCONE INVESTIGATION CONDUCTED AT THE SITE. A DETAILED STRATIGRAPHIC COLUMN OF THE UPPER 125-FEET OF SEDIMENTS ENCOUNTERED AT THE SITE HAS BEEN CONSTRUCTED FROM DATA COLLECTED DURING BOTH OF THESE INVESTIGATIONS. THIS COLUMN APPEARS IN FIGURE 1.3. ALTHOUGH THERE IS SOME LATERAL VARIATION OBSERVED IN THE STRATIGRAPHY OF THE SITE, PARTICULARLY WITHIN

THE 20 TO 45 FEET INTERVAL, FIVE DISTINCT STRATIGRAPHIC UNITS WERE

IDENTIFIED. THESE ARE DESIGNATED AS UNITS I THROUGH V.

ALTHOUGH SHALLOW GROUNDWATER OCCURS AT THE ABAP SITE FROM ABOUT 5 FEET BELOW THE SURFACE DOWNWARD, SIGNIFICANT YIELDS ARE ATTAINABLE ONLY IN CERTAIN ZONES. THE FIRST SIGNIFICANT WATER-BEARING ZONE IS

STRATIGRAPHIC UNIT II. GROUNDWATER WAS DETERMINED TO FLOW IN A NORTH TO NORTHWESTERLY DIRECTION IN UNIT II. THE SECOND ZONE IN WHICH WATER WAS FOUND IN SIGNIFICANT QUANTITIES WAS UNIT V, LOCATED BELOW A 70-FOOT THICK SEQUENCE OF CONFINING CLAYS AND CLAYEY SANDS (UNITS III AND IV).

TABLE 1.1 LISTS THE EXACT SCREENED INTERVALS FOR ALL WELLS INSTALLED DURING THE RI. THE SHALLOW SURFICIAL INTERVALS ARE SCREENED DOWN TO 30 FEET BELOW GROUND SURFACE, WHILE THE DEEP SURFICIAL INTERVAL WELLS ARE SCREENED, COLLECTIVELY, FROM APPROXIMATELY 23 FEET TO 43 FEET.

THE NEAREST SURFACE WATER BODY IS THAT OF THE LOOSAHATCHIE RIVER CANAL (LRC) WHICH IS LOCATED APPROXIMATELY 3,000 FEET DUE NORTH OF THE SITE.

THE RIVER IS RECOGNIZED BY THE STATE OF TENNESSEE AS BEING SUITABLE FOR RECREATIONAL PURPOSES, WILDLIFE, IRRIGATION, AND LIVESTOCK WATERING.

#SHEA
SITE HISTORY AND ENFORCEMENT ACTIVITIES

THE ARLINGTON BLENDING AND PACKAGING COMPANY (ABAP) WAS ENGAGED IN THE BLENDING AND PACKAGING OF VARIOUS PESTICIDE, HERBICIDE, AND OTHER CHEMICAL FORMULATIONS AT THE SITE FROM 1971 TO 1978. THE COMPANY CUSTOM FORMULATED THESE COMPOUNDS WITH SOLVENTS AND EMULSIFIERS IN ACCORDANCE WITH THEIR CLIENT COMPANIES' SPECIFICATIONS. THE FORMULATED PRODUCTS WERE THEN PACKAGED OR BOTTLED IN A FORM SUITABLE FOR RETAIL DISTRIBUTION.

DURING THE CONDUCT OF FORMULATING ACTIVITIES, SPILLS AND LEAKS OF CHEMICALS HANDLED AT THE SITE OCCURRED. AS A RESULT, THESE COMPOUNDS SOAKED INTO SITE SOILS AND PROCESS BUILDING FLOORING AND MIGRATED OFF-SITE VIA SURFACE RUNOFF. SIMILARLY, DURING THE SITE OPERATIONAL PERIOD, PROCESS WATERS CONTAINING HAZARDOUS CONTAMINANTS WERE DISCHARGED TO DITCHES DRAINING THE SITE. THE ABAP FACILITY, ADJACENT PROPERTIES (ONE OF WHICH IS A RESIDENTIAL COMMUNITY), AND NEARBY DITCHES AND SURFACE WATER BODIES WERE CONTAMINATED AS A RESULT OF THESE PRACTICES. NUMEROUS BARRELS AND OTHER CONTAINERS ALSO WERE LEFT AT THE SITE.

IN OCTOBER 1983, THE USEPA INITIATED AN IMMEDIATE REMOVAL IN AN EFFORT TO ELIMINATE POTENTIAL OR ACTUAL HEALTH THREATS FROM THE SITE. PEOPLE IDENTIFIED AS AT RISK FROM THE SITE INCLUDED RESIDENTS OF THE ADJACENT RESIDENTIAL COMMUNITY NEAREST TO THE ABAP EASTERN PROPERTY BOUNDARY; WORKERS EMPLOYED ON THE SITE AT THE HELENA CHEMICAL LABORATORY AT THE FRONT OF THE SITE PROPERTY; AND EMPLOYEES OF THE TENNESSEE DEPARTMENT OF TRANSPORTATION FACILITY LOCATED ADJACENT TO THE SITE'S WESTERN BORDER.

DURING THE REMOVAL ACTION, 1920 CUBIC YARDS (YD3) OF CONTAMINATED SOIL CONTAINING IN EXCESS OF 50 MG/KG CHLORDANE WERE EXCAVATED. PRIOR TO THE SOIL EXCAVATIONS, THE SITE AND ADJACENT PROPERTIES SOIL AND DRAINAGE DITCHES WERE SAMPLED FOR THEIR PESTICIDE CONTENT TO DELINEATE THE AREAL

EXTENT AND DEPTH OF GROSS SURFICIAL CONTAMINATION. SIMILARLY, 112 DRUMS CONTAINING STORED CHEMICAL WASTES WERE SAMPLED AND REMOVED FROM THE SITE ALONG WITH THE CONTAMINATED MATERIAL FROM THE SITE BUILDINGS AND GROUNDS.

AS THE RESULT OF DATA COLLECTED DURING THE RI, EPA DETERMINED THAT UNACCEPTABLE LEVELS OF PESTICIDES, PRIMARILY CHLORDANE, WERE LOCATED IN THE SOILS OF THE RESIDENTIAL PROPERTY LOCATED ALONG THE EASTERN FENCE LINE OF THE SITE. IN JULY 1990, AN EMERGENCY REMOVAL OF THESE SOILS WAS CONDUCTED AND APPROXIMATELY, 70 YD3 OF THE SOIL WERE EXCAVATED AND WILL BE STORED ON SITE UNTIL FINAL REMEDIATION.

ON AUGUST 15, 1986, USEPA REGION IV COMPLETED A HAZARDOUS RANKING SYSTEM (HRS) PACKAGE FOR THE SITE. AN AGGREGATE HRS SCORE OF 39.03 WAS DERIVED FOR THE SITE. THE SCORE WAS BASED UPON A GROUNDWATER ROUTE SCORE OF 67.35 AND A SURFACE WATER ROUTE SCORE OF 4.92. NEITHER THE AIR ROUTE NOR THE FIRE AND EXPLOSION HAZARDS WERE EVALUATED. IN JULY 1987, THE SITE WAS ADDED TO THE NATIONAL PRIORITIES LIST (NPL).

THE UNITED STATES DEPARTMENT OF JUSTICE, ON BEHALF OF EPA, FILED SUIT IN 1986 AGAINST TWO OF THE OWNERS AND OPERATORS OF THE ARLINGTON BLENDING AND PACKAGING SITE, AND AGAINST THREE COMPANIES WHO ARRANGED FOR FORMULATION OF THEIR PESTICIDE/HERBICIDE/CHEMICAL PRODUCTS BY ARLINGTON BLENDING AND PACKAGING COMPANY, WHICH RESULTED IN THE DISPOSAL OF WASTE AT THE SITE. THE SUIT WAS FILED UNDER SECTION 107 OF CERCLA FOR RECOVERY OF ALL COSTS INCURRED TO DATE AT THE SITE, INCLUDING THE COSTS FOR THE REMOVAL ACTION THAT WAS PERFORMED, AND FOR ALL STUDIES AND INVESTIGATIONS CONDUCTED. THE SUIT ALSO SEEKS DECLARATORY RELIEF FOR A DECLARATION THAT THESE DEFENDANTS ARE ALSO LIABLE FOR ANY COSTS EPA MAY INCUR IN THE FUTURE, INCLUDING THE COSTS FOR THE REMEDY IF EPA ULTIMATELY PERFORMS THE REMEDY CHOSEN IN THIS ROD. THIS SUIT ALSO SEEKS RECOVERY OF THE COSTS THAT HAVE BEEN INCURRED AT THE GALLAWAY PITS SITE. THE CASE IS CURRENTLY PENDING IN FEDERAL DISTRICT COURT AND IS IN THE DISCOVERY PHASE OF THE CASE.

ON JANUARY 27, 1988 USEPA REGION IV SENT NOTICE LETTERS TO FIVE (5) POTENTIALLY RESPONSIBLE PARTIES (PRPS) AND REQUESTED THAT THEY CONDUCT A REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS) FOR THE ABAP SITE. EACH OF THE PRPS DECLINED AND AS THE RESULT EPA INITIATED A FEDERALLY FUNDED RI/FS AT THE SITE.

#HCP
HIGHLIGHTS OF COMMUNITY PARTICIPATION

THE RI/FS AND PROPOSED PLAN FOR THE ARLINGTON BLENDING & PACKAGING SITE WERE PRESENTED AT THE PUBLIC MEETING HELD ON JANUARY 24, 1991 AT THE ARLINGTON TOWN HALL. THESE TWO DOCUMENTS WERE MADE AVAILABLE TO THE PUBLIC IN BOTH THE ADMINISTRATIVE RECORD AND AN INFORMATION REPOSITORY MAINTAINED AT THE EPA DOCKET ROOM IN REGION IV AND AT THE ARLINGTON

LIBRARY. NOTICE OF AVAILABILITY OF THESE TWO DOCUMENTS AND NOTICE OF THE PUBLIC MEETING WAS PUBLISHED IN THE COMMERCIAL APPEAL ON JANUARY 13, 1991. THE PUBLIC COMMENT PERIOD WAS HELD FROM JANUARY 24, 1991 THROUGH APRIL 9, 1991. AN EXTENSION TO THE ORIGINAL COMMENT PERIOD WAS GRANTED IN RESPONSE TO REQUESTS BY SITE PRPS FOR ADDITIONAL TIME TO PREPARE A THOROUGH REVIEW OF SITE FILES. AT THE PUBLIC MEETING, REPRESENTATIVES FROM EPA ANSWERED QUESTIONS ABOUT PROBLEMS AT THE SITE AND THE REMEDIAL ALTERNATIVES UNDER CONSIDERATION. A RESPONSE TO THE COMMENTS RECEIVED DURING THIS PERIOD IS INCLUDED IN THE RESPONSIVENESS SUMMARY, WHICH IS PART OF THIS RECORD OF DECISION. THIS DECISION DOCUMENT PRESENTS THE SELECTED REMEDIAL ACTION FOR THE ARLINGTON BLENDING & PACKAGING SITE, CHOSEN IN ACCORDANCE WITH CERCLA, AS AMENDED BY SARA AND, TO THE EXTENT PRACTICABLE, THE NATIONAL CONTINGENCY PLAN. THE DECISION FOR THIS SITE IS BASED ON THE ADMINISTRATIVE RECORD.

#SRRA
SCOPE AND ROLE OF RESPONSE ACTION WITHIN SITE STRATEGY

THE SELECTED REMEDY WILL ADDRESS CONTAMINATED MEDIA AT THE SITE BY ELIMINATING, TO THE EXTENT PRACTICABLE, THE VOLUME OF CONTAMINANTS PRESENT AND THE CONTINUED MIGRATION OF THESE CONTAMINANTS OFF SITE. THIS ACTION WILL REMEDIATE ALL AREAS OF CONTAMINATION AT THE SITE AND WILL INCLUDE THE CLEANING AND SUBSEQUENT DEMOLITION OF THOSE FORMER PROCESS BUILDINGS UNDER WHICH CONTAMINATED SOILS HAVE BEEN IDENTIFIED.

SURFACE AND SUBSURFACE SOILS CONTAINING SITE CONTAMINANTS IN CONCENTRATIONS AT WHICH LEACHING INTO GROUNDWATER MAY POSE A CONTINUING THREAT TO CONTAMINATE GROUND WATER ABOVE ACCEPTABLE LEVELS WILL BE EXCAVATED AND THERMALLY TREATED. SURFACE SOILS WHICH POSE AN UNACCEPTABLE RISK AS A RESULT OF FUTURE LONG-TERM DERMAL CONTACT AND ORAL INGESTION WILL ALSO BE EXCAVATED AND THERMALLY TREATED TO ACCEPTABLE LEVELS.

CONTAMINATED GROUNDWATER IDENTIFIED ON AND DOWNGRADIENT OF THE SITE IN THE SURFICIAL AQUIFER WILL BE EXTRACTED FOR TREATMENT UNTIL GROUNDWATER IS RESTORED TO DRINKING WATER QUALITY. THE GROUNDWATER USAGE WILL BE RESTRICTED IN THESE AREAS UNTIL HEALTH BASED LEVELS HAVE BEEN ACHIEVED.

THE GOALS OF THE REMEDIAL ACTION WILL BE TO REDUCE THE RISKS ASSOCIATED WITH LONG-TERM EXPOSURE TO CONTAMINATED ON-SITE SOILS AND GROUND WATER, TO REDUCE MIGRATION OF CONTAMINANTS BETWEEN SITE SOILS AND GROUND WATER, AND TO REDUCE OFF-SITE CONTAMINANT MIGRATION THROUGH THE GROUNDWATER PATHWAY.

#SSC
SUMMARY OF SITE CHARACTERISTICS

THE RI CONDUCTED AT THE ARLINGTON BLENDING AND PACKAGING SITE IDENTIFIED

SOILS, SEDIMENT, AND GROUNDWATER ON AND ADJACENT TO THE SITE THAT WERE CONTAMINATED WITH PESTICIDES, HERBICIDES, AND/OR SOLVENTS USED IN THE FORMULATION OF THESE COMPOUNDS AND OTHER CHEMICALS HANDLED AT THE FACILITY THAT COMPRISE THE PRINCIPLE THREAT POSED BY THE SITE. THE AREAL EXTENT OF PESTICIDE-CONTAMINATED SOILS, IDENTIFIED ABOVE ACTION LEVELS, IS FOUND PRIMARILY AROUND THE EXTERIOR AND UNDERNEATH THE CONCRETE FLOORING OF THE PROCESS BUILDINGS AT A DEPTH OF UP TO 12 FEET. THE VOLUME OF THESE SOILS IS ESTIMATED TO BE APPROXIMATELY 24,000 YD3. THE CONTAMINATED SOILS ARE THE LIKELY SOURCE FOR THE GROUNDWATER CONTAMINATION IDENTIFIED IN THE RI. CHLORDANE LEVELS OF UP TO 400 MG/KG WERE DETECTED, WHILE PENTACHLOROPHENOL WAS IDENTIFIED AT UP TO 130 MG/KG IN A SUBSURFACE SOIL SAMPLE COLLECTED UNDERNEATH THE CONCRETE FLOORING IN ONE OF THE SITE PROCESS BUILDINGS. GROUNDWATER CONTAMINATION WAS IDENTIFIED IN TEN (10) OF THE WELLS AT CONCENTRATIONS THAT EXCEEDED THE CURRENT OR PROPOSED MAXIMUM CONTAMINANT LEVELS (MCLS). FIGURE 5.1 DEPICTS THE ESTIMATED EXTENT OF CONTAMINATION PLUMES IDENTIFIED IN THE RI. THOSE WELLS LOCATED ON SITE CONTAINED THE LARGEST NUMBER OF CONTAMINANTS AT THE GREATEST CONCENTRATIONS, ALTHOUGH ONE OF THE MONITORING WELLS, LOCATED 3000 FEET DOWNGRADIENT OF THE SITE, CONTAINED 1,1-DICHLOROETHYLENE IN EXCESS OF THE MCL.

#SSR
SUMMARY OF SITE RISKS

THE ABAP BASELINE RISK ASSESSMENT CONCLUDED THAT THE PRIMARY HEALTH RISK POSED BY THE SITE IS THROUGH DIRECT EXPOSURE (BOTH ORAL AND DERMAL) TO CONTAMINATED SURFACE SOILS AND INGESTION OF CONTAMINATED GROUNDWATER. THE BASELINE RISK ASSESSMENT, WAS BASED ON CONTAMINATED ENVIRONMENTAL SITE MEDIA, AS IDENTIFIED BY REGION IV (ESD) SAMPLING STUDIES CONDUCTED IN 1988-1990. IT WAS CONDUCTED IN ORDER TO PROVIDE AN ASSESSMENT OF THE RESULTING IMPACT TO HUMAN HEALTH AND ENVIRONMENT IF CONTAMINATED SOILS AND GROUNDWATER, AT THE SITE, WERE NOT REMEDIATED. THE BASELINE RISK ASSESSMENT IS PRESENTED AS CHAPTER 6 OF THE RI REPORT.

THE CONTAMINANTS OF CONCERN IDENTIFIED IN THE RI REFLECT THE NATURE OF THE OPERATIONS AT THE SITE, NAMELY PESTICIDE AND HERBICIDE FORMULATION. THE CONTAMINANTS OF CONCERN IDENTIFIED IN THE BASELINE RISK ASSESSMENT CONSIST OF FIVE PESTICIDES, TWO SOLVENTS, AND THREE INORGANIC CHEMICALS AND ARE PRESENTED IN TABLE 6.1.

PESTICIDES WERE THE MAJOR HAZARDOUS CONTAMINANTS DETECTED IN SOILS AND OF THESE, CHLORDANE WAS THE MOST FREQUENTLY DETECTED, GENERALLY IN THE GREATEST CONCENTRATIONS. CHLORDANE WAS THE PRIMARY SOIL CONTAMINANT AND WAS THE BASIS FOR THE RISK ASSUMPTIONS SHOWN IN TABLE 6.2. HEPTACHLOR

WAS THE NEXT MOST FREQUENTLY DETECTED PESTICIDE AND WAS THE MAJOR CONTAMINANT OF CONCERN IN SURFACE SOIL FROM GRID 10 (474 PPM, THE AVERAGE OF DUPLICATES TAKEN FROM THIS GRID) AND EQUALLED THE CHLORDANE CONCENTRATION (83 PPM) IN SURFACE SOIL BENEATH THE CONCRETE FLOOR OF BUILDING G. PENTACHLOROPHENOL WAS DETECTED IN A FEW SOIL SAMPLES. THE

HIGHEST CONCENTRATION (130 PPM) WAS DETECTED IN A SURFACE SOIL SAMPLE FOUND BENEATH THE CONCRETE FLOOR OF BUILDING E AND REMAINED DETECTABLE (6 PPM) IN THE SUBSURFACE SAMPLE TAKEN AT 16 FEET. ONLY THESE THREE COMPOUNDS WERE CONSIDERED AS ORGANIC CONTAMINANTS OF CONCERN FOR THE SOIL MEDIUM. ARSENIC APPEARS TO BE THE ONLY INORGANIC CONTAMINANT ASSOCIATED WITH SITE ACTIVITY THAT IS PRESENT AT A FREQUENCY AND CONCENTRATION TO WARRANT CONSIDERATION AS A SITE RELATED CONTAMINANT OF CONCERN.

ALL GROUNDWATER CONTAMINANTS IDENTIFIED IN CONCENTRATIONS THAT EITHER EQUALLED OR EXCEEDED THEIR RESPECTIVE MCL (CURRENT OR PROPOSED) WERE DESIGNATED AS A CONTAMINANTS OF CONCERN, IF THEY WERE DETECTED IN ONE OR MORE SAMPLES. NO CONTAMINANT THAT DOES NOT HAVE AN MCL OR A PROPOSED MCL WAS DETECTED IN SUFFICIENT CONCENTRATION TO WARRANT INCLUSION ON THE CONTAMINANT OF CONCERN LIST. ON-SITE MONITORING WELLS INDICATED THAT SEVERAL CONTAMINANTS EXCEEDED MCLS. THE ONLY OFF SITE GROUNDWATER SAMPLE HAVING ORGANIC CONTAMINATION EXCEEDING MCL LEVELS WAS FROM A DISTANT DOWNGRADIENT LOCATION (AB-9D). THE DEEP WELL AT THIS LOCATION SHOWED A 1,1-DICHLOROETHYLENE LEVEL OF 26 PICOGRAM/L COMPARED TO THE MCL OF 7 PICOGRAM/L.

NO SIGNIFICANT CONTAMINATION WAS INDICATED IN THE FIVE SURFACE WATER SAMPLES AND THIS MEDIUM WAS NOT EVALUATED IN THE RISK ASSESSMENT. AN EVALUATION OF THE SEDIMENT DATA INDICATED THAT PESTICIDES ARE THE ONLY HAZARDOUS SUBSTANCES DETECTED AT SIGNIFICANT CONCENTRATION AND FREQUENCY IN THIS MEDIUM. OF THE POSITIVE FINDINGS, CHLORDANE WAS ALWAYS DETECTED IN THE HIGHEST CONCENTRATION AND REPRESENTS THE ONLY CONTAMINANT OF CONCERN FROM THE SEDIMENT DATA.

EXPOSURE ASSESSMENT

THE OBJECTIVE OF THE EXPOSURE ASSESSMENT IS TO ESTIMATE THE TYPE AND MAGNITUDE OF EXPOSURES TO THE CHEMICALS OF POTENTIAL CONCERN THAT ARE PRESENT AT OR MIGRATING FROM THE SITE. THE RESULTS OF THE EXPOSURE ASSESSMENT ARE COMBINED WITH CHEMICAL-SPECIFIC TOXICITY INFORMATION TO CHARACTERIZE POTENTIAL RISKS.

THE TWO PRIMARY PATHWAYS OF EXPOSURE TO SIGNIFICANT CONCENTRATIONS OF HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SITE IS THROUGH CURRENT AND FUTURE DIRECT SOIL CONTACT VIA INGESTION AND DERMAL PATHWAYS AND THROUGH FUTURE EXPOSURE TO GROUNDWATER. THE INHALATION ROUTE OF EXPOSURE WAS NOT BELIEVED TO BE IMPORTANT IN OPEN SPACE SINCE THE SOIL CONTAMINANTS OF CONCERN READILY ADSORB TO SOIL PARTICLES AND ARE RELATIVELY NONVOLATILE UNDER NORMAL CONDITIONS.

THE SITE IS LOCATED ON A MAJOR HIGHWAY IN A LIGHTLY DEVELOPED, SOMEWHAT RURAL SETTING. A SMALL RESIDENTIAL AREA (44 HOMES) EXISTS IMMEDIATELY ADJACENT TO THE EASTERN BOUNDARY OF THE SITE. WITHOUT STRICT ZONING, IT IS UNCLEAR WHETHER THE FUTURE USE OF THIS SITE, AFTER IT IS REMEDIATED, WOULD BE FOR RESIDENTIAL DEVELOPMENT OR AGRICULTURAL/INDUSTRIAL USE.

THEREFORE, IT SEEMS PRUDENT TO ASSUME THAT DIRECT AND FREQUENT CONTACT BY CHILDREN AND ADULTS IN A RESIDENTIAL SETTING COULD OCCUR IN THE FORESEEABLE FUTURE. CURRENTLY, THE MAJOR PORTION OF THE SITE IS FENCED WITH A LOCKED GATE AND WITHOUT ANY AUTHORIZED HUMAN ACTIVITY WITH THE EXCEPTION OF A SMALL COMMERCIAL LABORATORY IN THE FRONT OF THE PROPERTY WITHIN A SEPARATELY FENCED AREA.

SOIL CONTAMINATION WAS DETECTED IN A FEW LOCATIONS OUTSIDE THE FENCED AREA AT CONCENTRATIONS AND ACCESSIBILITY THAT COULD RESULT IN SIGNIFICANT CURRENT EXPOSURE. FOR EXAMPLE, A COMPOSITE SOIL SAMPLE FROM GRID #10 CONTAINED HIGH LEVELS OF HEPTACHLOR AND CHLORDANE. ABOUT HALF THE AREA OF THIS GRID IS OUTSIDE THE FENCE ON THE SOUTHEASTERN PROPERTY

LINE. THIS AREA ALONG A RAILROAD TRACK HAS FREE ACCESS FROM THE RESIDENTIAL AREA.

NEARBY RESIDENTIAL SOIL TESTING DURING THE 1988 SAMPLING PROGRAM REVEALED CONSIDERABLY LOWER TOTAL PESTICIDE CONCENTRATIONS IN SURFACE SOIL. ANOTHER CONTAMINATED AREA OF CONCERN, OUTSIDE THE PROPERTY FENCE, EXISTS IN THE NORTHWEST AND NORTHEAST CORNERS OF THE SITE THAT EXTENDS OFF SITE DOWN THE ROADWAY DITCH TO THE WEST AND EAST OF THE SITE. THE SOIL/SEDIMENT SAMPLES TAKEN FROM THESE RAINWATER DRAINAGE AREAS CONTAINED ELEVATED LEVELS OF CHLORDANE.

NONE OF THESE NON-RESIDENTIAL OFF-SITE AREAS APPEAR TO RECEIVE HEAVY FOOT TRAFFIC OR ARE OBVIOUS PATHWAYS OF ROUTINE EXPOSURE. HOWEVER, THE CONTAMINANTS ARE AT THE SOIL SURFACE AND DIRECT SOIL OR DUST CONTACT COULD RESULT IN EXPOSURE TO THE RESIDENTS IN THIS AREA.

CONTAMINANTS IN THE SOIL ALSO HAVE AN EXPOSURE PATHWAY VIA MIGRATION TO GROUND WATER AND SUBSEQUENT INGESTION. ALTHOUGH GROUND WATER IN AQUIFER UNITS I AND II IS NOT CURRENTLY USED AS A DRINKING WATER SOURCE, THE STATE OF TENNESSEE CLASSIFIES THE AQUIFER AT THE ABAP SITE AS A CLASS IIB AQUIFER, WHICH IS TO BE MAINTAINED AT DRINKING WATER QUALITY.

THE RI REPORT CONCLUDED THAT A CONTAMINANT PLUME EXISTS IN AQUIFER UNITS I AND II (FIGURE 5.1) AND THAT THE CONTAMINANTS HAVE MIGRATED OFF-SITE. THIS OFF-SITE MIGRATION PRESENTS A THREAT TO THE GROUNDWATER QUALITY, WHICH IS TO BE MAINTAINED AT DRINKING WATER STANDARDS, AND AN OFF-SITE RISK TO THE LOOSAHATCHIE RIVER CANAL.

DUE TO THE UNCERTAIN NATURE REGARDING THE FUTURE USE OF THE SITE PROPERTY, BOTH A FUTURE CHILD RESIDENT AND FUTURE WORKER EXPOSURE SCENARIO WERE DEVELOPED. THE RESIDENT SCENARIO CONSIDERED THAT A FUTURE CHILD WOULD INGEST THE TOTAL AMOUNT OF THE ASSUMED SOIL INTAKE LEVEL

(200 MG/DAY) FROM THE SPECIFIC AREA OF THE SITE UNDER CONSIDERATION. THE INTAKE SCENARIO IS BASED ON THE ASSUMPTION THAT CHILDREN BETWEEN THE AGES OF 1-6 YEARS SPEND MOST OF THEIR TIME AND INGEST ALL SOIL AT THE RESIDENT LOCATION. THE FUTURE WORKER SCENARIO ASSUMED THAT AN ADULT WORKER WOULD COME IN CONTACT WITH THE SITE DURING A 250 DAY WORK YEAR

FOR 20 YEARS.

TOXICITY ASSESSMENT

THE TOXICITY ASSESSMENT WAS CONDUCTED TO FURTHER DETERMINE THE POTENTIAL HAZARD POSED BY THE CHEMICALS OF CONCERN FOR WHICH EXPOSURE PATHWAYS HAVE BEEN IDENTIFIED. AVAILABLE EVIDENCE IS WEIGHED IN REGARDS TO THE POTENTIAL OF PARTICULAR CONTAMINANTS TO CAUSE ADVERSE EFFECTS IN EXPOSED INDIVIDUALS AND TO PROVIDE, WHERE POSSIBLE, AN ESTIMATE OF THE RELATIONSHIP BETWEEN THE EXTENT OF EXPOSURE TO A CONTAMINANT AND THE INCREASED LIKELIHOOD AND/OR SEVERITY OF ADVERSE EFFECTS.

CANCER POTENCY FACTORS (CPFS) HAVE BEEN DEVELOPED BY EPA'S CARCINOGENIC ASSESSMENT GROUP FOR ESTIMATING EXCESS LIFETIME CANCER RISKS ASSOCIATED WITH EXPOSURE TO POTENTIALLY CARCINOGENIC CHEMICALS. CPFS, WHICH ARE EXPRESSED IN UNITS OF (MG/KG-DAY)-1, ARE MULTIPLIED BY THE ESTIMATED INTAKE OF A POTENTIAL CARCINOGEN, IN (MG/KG-DAY), TO PROVIDE AN UPPER-BOUND ESTIMATE OF THE EXCESS LIFETIME CANCER RISK ASSOCIATED WITH EXPOSURE AT THAT INTAKE LEVEL. THE TERM "UPPER BOUND" REFLECTS THE CONSERVATIVE ESTIMATE OF THE RISKS CALCULATED FROM THE CPF. USE OF THIS APPROACH MAKES UNDERESTIMATION OF THE ACTUAL CANCER RISK HIGHLY UNLIKELY. CPFS ARE DERIVED FROM THE RESULTS OF HUMAN EPIDEMIOLOGICAL STUDIES OR CHRONIC ANIMAL BIOASSAYS TO WHICH ANIMAL-TO-HUMAN EXTRAPOLATION AND UNCERTAINTY FACTORS HAVE BEEN APPLIED.

REFERENCE DOSES (RFDS) HAVE BEEN DEVELOPED BY EPA FOR INDICATING THE POTENTIAL FOR ADVERSE HEALTH EFFECTS FROM EXPOSURE TO CHEMICALS EXHIBITING NONCARCINOGENIC EFFECTS. RFDS, WHICH ARE EXPRESSED IN UNITS OF MG/KG-DAY, ARE ESTIMATES OF LIFETIME DAILY EXPOSURE LEVELS FOR HUMANS, INCLUDING SENSITIVE INDIVIDUALS. ESTIMATED INTAKES OF CHEMICALS FROM ENVIRONMENTAL MEDIA (E.G., THE AMOUNT OF A CHEMICAL INGESTED FROM CONTAMINATED DRINKING WATER) CAN BE COMPARED TO THE RFD. RFDS ARE DERIVED FROM HUMAN EPIDEMIOLOGICAL STUDIES OR ANIMAL STUDIES TO WHICH UNCERTAINTY FACTORS HAVE BEEN APPLIED (E.G.,TO ACCOUNT FOR THE USE OF ANIMAL DATA TO PREDICT EFFECTS ON HUMANS). THESE UNCERTAINTY FACTORS HELP ENSURE THAT THE RFDS WILL NOT UNDERESTIMATE THE POTENTIAL FOR ADVERSE NONCARCINOGENIC EFFECTS TO OCCUR.

THE AGENCY HAS DERIVED THE CANCER POTENCY FACTOR (CPF) AND REFERENCE DOSE (RFD) VALUES FOR THE CONTAMINANTS OF CONCERN AT THE SITE FOR USE IN DETERMINING THE UPPERBOUND LEVEL OF CANCER RISK AND NON-CANCER HAZARD FROM EXPOSURE TO A GIVEN LEVEL OF CONTAMINATION (TABLE 6.3).

RISK CHARACTERIZATION

FUTURE RISK SCENARIOS, BASED ON REASONABLE MAXIMUM EXPOSURES TO CONTAMINANTS FOUND IN SOIL, WERE DEVELOPED WHICH ESTIMATED THE PROBABILITY OF RESULTING CARCINOGENIC HEALTH EFFECTS. EXPOSURE SCENARIOS WERE DEVELOPED FOR BOTH FUTURE ADULTS WORKING AND FUTURE CHILDREN PLAYING AT THE SITE, SINCE FUTURE LAND USE IS UNCERTAIN.

THE ON-SITE RISK TO FUTURE WORKERS AND CHILD RESIDENTS WAS EVALUATED BY DETERMINING EXPOSURE TO AREAS OF THE SITE HAVING SIMILAR LEVELS OF CONTAMINATION. A NUMBER OF AREAS OUTSIDE THE FENCED PROPERTY BOUNDARY HAD CHLORDANE LEVELS THAT WERE EVALUATED UNDER A CURRENT CHILD RESIDENT SCENARIO SINCE THEY WERE FREELY ACCESSIBLE FROM THE RESIDENTIAL AREA ADJACENT TO THE EASTERN PROPERTY BOUNDARY. THE AVAILABILITY OF COMPOSITE SAMPLING DATA FROM EACH GRIDDED AREA (100 X 100 FT.) ALLOWED FOR EXPOSURE ASSUMPTIONS AND THEREBY RISK ESTIMATES FOR VARIOUS CONTAMINANT CONCENTRATION AND LOCATIONS WITHIN THE SITE.

EXCESS LIFETIME CANCER RISKS ARE DETERMINED BY MULTIPLYING THE INTAKE LEVEL BY THE CANCER POTENCY FACTOR. THESE RISKS ARE PROBABILITIES THAT ARE GENERALLY EXPRESSED IN SCIENTIFIC NOTATION ((E.G., 1 X (10-6)). AN EXCESS LIFETIME CANCER RISK OF 1 X (10-6) INDICATES THAT, AS A PLAUSIBLE UPPER BOUND RISK, AN INDIVIDUAL HAS A ONE IN ONE MILLION CHANCE OF DEVELOPING CANCER AS A RESULT OF SITE-RELATED EXPOSURE TO A CARCINOGEN OVER A 70-YEAR LIFETIME UNDER THE SPECIFIC EXPOSURE CONDITIONS AT A SITE.

EPA PREFERS THAT REMEDIATION OF SUPERFUND SITES ACHIEVE A RESIDUAL CANCER RISK NO GREATER THAT (10-6) (1 CHANCE IN 1,000,000). HOWEVER, DEPENDING UPON SITE FACTORS, A RISK OF (10-4) (1 IN 10,000) MAY BE CONSIDERED PROTECTIVE. THE CALCULATED UPPERBOUND RISKS FROM EXPOSURE TO HOT SPOT AREAS OF THE SITE WOULD FALL OUTSIDE THE PROTECTIVE RANGE. THE SUM OF RISK TO THE ON-SITE WORKERS WAS CALCULATED TO BE 1.1 X (10-4). THE SUMMED UPPERBOUND CARCINOGENIC RISK TO CHILDREN RESIDING AND PLAYING ON SITE IN THE FUTURE WERE CALCULATED TO BE UP TO 1.1 X (10-3). THE CARCINOGENIC UPPERBOUND RISK FOR EACH OF THE CONTAMINANTS OF CONCERN IDENTIFIED IN SITE SOILS IS PRESENTED IN TABLES 6.4 AND 6.5.

THE NON-CARCINOGENIC TOXICITY RISK FROM SOIL CONTAMINANTS WAS ALSO EVALUATED. THIS WAS DONE THROUGH THE CALCULATION OF A HAZARD INDEX (HI). THE HI IS OBTAINED BY DIVIDING THE ASSUMED DAILY EXPOSURE DOSE BY THE CHRONIC RFD. HI VALUES ABOVE 1.0 INDICATE AN UNACCEPTABLE RISK THAT INCREASES IN MAGNITUDE WITH HIGHER NUMERICAL SCORES ABOVE 1.0. THE HI PROVIDES A USEFUL REFERENCE POINT FOR GAUGING THE POTENTIAL SIGNIFICANCE OF MULTIPLE CONTAMINANT EXPOSURES WITHIN A SINGLE MEDIUM OR ACROSS MEDIA. THE HI FOR FUTURE RESIDENT CHILDREN AT VARIOUS HOT SPOTS ON THE SITE RANGED FROM WT1 TO 46. TABLE 6.4 CONTAINS A SUMMARY OF THE HI VALUES CALCULATED FOR THE CHILD SCENARIO.

THE HUMAN HEALTH RISK POSED BY THE INGESTION OF GROUNDWATER WAS DETERMINED BY COMPARING DETECTED LEVELS OF THE CONTAMINANTS WITH DRINKING WATER STANDARDS FOR THESE SUBSTANCES. THE FOLLOWING CHEMICALS

WERE DETECTED IN SAMPLES TAKEN FROM SITE GROUND-WATER WELLS IN CONCENTRATIONS THAT EXCEED THEIR RESPECTIVE MCLS: BENZENE, CHLORDANE, CHROMIUM, 1,1-DICHLOROETHENE, ENDRIN, HEPTACHLOR EPOXIDE, PENTACHLOROPHENOL AND SELENIUM. ANY EXCEEDENCE OF THE MCL VALUES BY WATER SAMPLES TAKEN WITHIN THE CONTAMINATION PLUME AT OR DOWNGRADIENT TO

THE AREA OF ATTAINMENT (I.E. THE ENTIRE GROUNDWATER PLUME EXCEPT THE AREA DIRECTLY BENEATH ANY WASTE THAT IS CONTAINED AND MANAGED ON SITE) REPRESENTS A CAUSE FOR CONCERN.

THE GROUND-WATER AQUIFER, INVESTIGATED IN THE RI, IS NOT CURRENTLY USED AS A DRINKING WATER SOURCE, AND THE NEAREST KNOWN PRIVATE WELL IS ABOUT 4000 FEET TO THE WEST. THE TWO (2) ARLINGTON MUNICIPAL WELLS ARE ABOUT 8000-FEET AND ALSO TO THE WEST OF THE SITE (FIGURE 6.1). HOWEVER, THE SURFICIAL AQUIFER BENEATH THE SITE CONTAINS GROUND WATER CLASSIFIED AS EITHER IIA (GROUND WATER CURRENTLY USED AS A SOURCE OF DRINKING WATER) OR IIB (GROUND WATER THAT IS A POTENTIAL SOURCE OF DRINKING WATER) BY THE STATE OF TENNESSEE. ALSO THE MEMPHIS SAND AQUIFER, WHICH IS LOCATED BENEATH THE SITE, CONTAINS GROUND WATER WHICH MAY BE CLASSIFIED AS IIA AND WOULD DEPEND UPON THE DISSOLVED SOLIDS CONTENT OF THE GROUND WATER.

DATA FROM ON-SITE WELLS AT TWO (2) DEPTHS IN THE SURFICIAL AQUIFER CLEARLY INDICATE THAT IT HAS BEEN CONTAMINATED BY PESTICIDES AND VOLATILE ORGANICS FROM OPERATIONS AT THE SITE. IN ADDITION, A RECENT SAMPLE FROM A DEEP WELL (ABOUT 40-FT. BELOW SURFACE) LOCATED ABOUT 3,000-FEET DOWNGRADIENT OF THE SITE CONTAINED DETECTABLE LEVELS OF SEVEN (7) ORGANIC CONTAMINANTS.

THE CONTAMINANTS CLASSIFIED BY EPA AS CARCINOGENS - CHLORDANE, HEPTACHLOR, AND ARSENIC - WERE IDENTIFIED AS THE PRIMARY SOIL CONTAMINANTS. THE SPECIFIC CLEAN-UP LEVELS FOR EACH OF THE CONTAMINANTS OF CONCERN DETECTED IN SITE SOILS ARE PRESENTED IN TABLE 9.1.

THERE ARE NO SENSITIVE HABITATS OR ECOLOGICAL SYSTEMS WITHIN AREAS IN CLOSE PROXIMITY TO THE SITE, BUT A GROUNDWATER CONTAMINANT PLUME CONSISTING PRIMARILY OF 1,1-DCE AND 1,1-DICHLOROETHANE HAS REACHED THE DISCHARGE POINT IN THE LOOSAHATCHIE RIVER CANAL. THESE COMPOUNDS HAVE NOT BEEN FOUND TO BE DISCHARGING AT CONCENTRATIONS ABOVE THEIR RESPECTIVE AMBIENT WATER QUALITY CRITERIA LEVELS AND DO NOT BIOACCUMULATE TO ANY DEGREE. THEREFORE, THESE CONTAMINANTS ARE NOT BELIEVED POSE A SIGNIFICANT THREAT TO AQUATIC LIFE. REMEDIATION OF THE GROUNDWATER SOURCE OF CONTAMINATION TO DRINKING WATER STANDARDS WILL BE PROTECTIVE OF AQUATIC LIFE IN THIS SURFACE WATER BODY.

RISK UNCERTAINTY

THERE IS A GENERALLY RECOGNIZED UNCERTAINTY IN HUMAN RISK VALUES DEVELOPED FROM EXPERIMENTAL DATA. THIS IS PRIMARILY DUE TO THE UNCERTAINTY OF DATA EXTRAPOLATION IN THE AREAS OF (1) HIGH TO LOW DOSE EXPOSURE AND (2) ANIMAL DATA TO HUMAN EXPERIENCE. THE SITE-SPECIFIC UNCERTAINTY IS MAINLY IN THE DEGREE OF ACCURACY OF THE EXPOSURE

ASSUMPTIONS. MOST OF THE ASSUMPTIONS USED IN THIS AND ANY RISK ASSESSMENT HAVE NOT BEEN VERIFIED. FOR EXAMPLE, THE DEGREE OF CHEMICAL ABSORPTION FROM THE GUT OR THROUGH THE SKIN OR THE AMOUNT OF SOIL CONTACT IS NOT KNOWN WITH CERTAINTY. GENERALLY ACCEPTED DEFAULT VALUES PROVIDED IN AGENCY GUIDANCE WERE USED HERE. HOWEVER, IT SHOULD BE NOTED

THAT LITTLE DATA OR GUIDANCE IS AVAILABLE ON THE DERMAL ABSORPTION OF PARTICULATE-BOUND CONTAMINANTS. IN THE RISK ASSESSMENT CONDUCTED FOR THE SITE, THE DERMAL PATHWAY YIELDED A SIGNIFICANT CONTRIBUTION TO THE CALCULATED DIRECT EXPOSURE RISKS.

IN THE PRESENCE OF SUCH UNCERTAINTY, THE AGENCY AND THE RISK ASSESSOR HAS THE OBLIGATION TO MAKE CONSERVATIVE ASSUMPTIONS SUCH THAT THE CHANCE IS VERY SMALL, APPROACHING ZERO, FOR THE ACTUAL HEALTH RISK TO BE GREATER THAN THAT DETERMINED THROUGH THE RISK PROCESS. ON THE OTHER HAND, THE PROCESS IS NOT TO YIELD ABSURDLY CONSERVATIVE RISKS VALUES THAT HAVE NO BASIS IN REALITY. THAT BALANCE WAS KEPT IN MIND IN THE DEVELOPMENT OF EXPOSURE ASSUMPTIONS AND PATHWAYS AND IN THE INTERPRETATION OF DATA AND GUIDANCE FOR THIS BASELINE RISK ASSESSMENT.

SUMMARY

THE HEALTH RISK POSED BY THIS NPL SITE IS PRIMARILY FROM DIRECT EXPOSURE TO CONTAMINATED SURFACE SOIL AND THE INGESTION OF GROUND WATER BENEATH THE SITE. THE MAJOR SOIL CONTAMINANTS ARE NOT UNIFORMLY DISTRIBUTED OVER THE SITE SURFACE BUT EXIST IN "HOT SPOTS" OF VARYING CONCENTRATIONS.

THE CONTAMINANTS OF CONCERN REFLECT THE NATURE OF THE PAST OPERATIONS AT THE SITE, I.E., PESTICIDE AND HERBICIDE FORMULATION. THOSE CONTAMINANTS RETAINED AS CONTAMINANTS OF CONCERN INCLUDED FIVE PESTICIDES, TWO SOLVENTS, AND THREE INORGANIC CONTAMINANTS - ARSENIC, CHROMIUM, AND SELENIUM. OF THE THREE INORGANIC CONTAMINANTS, ONLY ARSENIC HAS BEEN RETAINED FOR REMEDIATION BECAUSE OF ITS DETECTION AT ELEVATED LEVELS IN HOTSPOTS AND ITS APPARENT USE DURING SITE ACTIVITIES (TABLE 6.1). BOTH CHROMIUM AND SELENIUM WERE DETECTED IN ON-SITE WELLS AT LEVELS ABOVE CURRENT OR PROPOSED MCLS, HOWEVER, THEY ARE UNLIKELY TO BE SITE RELATED.

THE HEALTH RISKS OF SOIL/SEDIMENT CONTAMINANTS OF CONCERN WERE EVALUATED UNDER TWO EXPOSURE SCENARIOS, I.E., INGESTION AND DERMAL ABSORPTION BY FUTURE ADULT WORKERS AND CHILD RESIDENTS. THE CHILD RESIDENTS REPRESENTED A REALISTIC FUTURE SCENARIO SINCE THE SITE AND SURROUNDING AREA IS NOT COMMITTED TO INDUSTRIAL USE AND IS BORDERED TO THE EAST BY A RESIDENTIAL AREA. A NUMBER OF AREAS OUTSIDE THE FENCED PROPERTY BOUNDARY HAD CHLORDANE LEVELS THAT WERE EVALUATED UNDER A CURRENT CHILD RESIDENT SCENARIO SINCE THEY WERE FREELY ACCESSIBLE FROM THE RESIDENTIAL AREA ADJACENT TO THE EAST PROPERTY BOUNDARY.

THE SUM OF THE RISK TO THE ON-SITE WORKERS WAS FOUND TO BE 1.1 X (10-4). THE HOT SPOT AREAS AT THE SITE WERE SHOWN TO PRODUCE AN UNACCEPTABLE UPPERBOUND RISK TO A FUTURE CHILD RESIDENT AT A CALCULATED LEVEL OF 1.1

X (10-3) AND A HAZARD INDEX OF 46. OTHER AREAS ON-SITE AND OFF-SITE EXCEEDED THE UPPERBOUND POINT-OF-DEPARTURE RISK LEVEL OF (10-6). IN ADDITION, THE NON-CANCER TOXICITY SHOWED HAZARD INDEX VALUES GREATER THAN 1 FOR SEVERAL AREAS.

RISK FROM THE INGESTION OF GROUND WATER WAS EVALUATED RELATIVE TO CURRENT AND PROPOSED MCLS. SINCE THE SUMMED RISK FROM ALL CHEMICALS DETECTED AT THE MCL LEVEL WAS WITHIN THE NCP ACCEPTABLE RANGE, NO ADDITIONAL RISK EVALUATION WAS CONDUCTED. ON-SITE MONITORING WELLS SCREENED TO A DEPTH OF ABOUT 40 FEET YIELDED GROUND WATER CONTAINING BENZENE, CHLORDANE, CHROMIUM, 1,1-DICHLOROETHENE, ENDRIN, HEPTACHLOR EPOXIDE, SELENIUM, AND PENTACHLOROPHENOL IN EXCESS OF CURRENT OR PROPOSED MCLS. AN OFF-SITE WELL ABOUT 3,000 FT. DOWNGRADIENT YIELDED 1,1-DICHLOROETHENE AT A CONCENTRATION OF 26 PPB, ABOUT FOUR TIMES THE MCL. ALTHOUGH OTHER CONTAMINANTS WERE DETECTED IN THIS WELL, NO OTHER FINDINGS IN ANY OFF-SITE WELL EXCEEDED MCL VALUES.

ACTUAL OR THREATENED RELEASES OF HAZARDOUS SUBSTANCES FROM THIS SITE, IF NOT ADDRESSED BY IMPLEMENTING THE RESPONSE ACTION SELECTED IN THIS ROD, MAY PRESENT AN IMMINENT AND SUBSTANTIAL ENDANGERMENT TO PUBLIC HEALTH, WELFARE, OR THE ENVIRONMENT.

#DRA
DESCRIPTION OF REMEDIAL ALTERNATIVES

THE FOLLOWING REMEDIAL ALTERNATIVES WERE SELECTED FOR EVALUATION:

1. NO ACTION;

2. ON-SITE CLEANING, CAPS, LAND-USE CONTROLS, FENCE MAINTENANCE, AND MONITORING;

3. AND 3A. EXCAVATION, OFF-SITE THERMAL TREATMENT (INCINERATION), SOLIDIFICATION AND LANDFILL OF CONTAMINATED SOILS, ACTIVATED CARBON TREATMENT AND DISCHARGE OF GROUND-WATER TO POTW OR SURFACE WATER;

4. AND 4A. EXCAVATION, ON-SITE THERMAL TREATMENT (INCINERATION), SOLIDIFICATION, AND ON-SITE BACKFILLING OF CONTAMINATED SOILS, ACTIVATED CARBON GROUND-WATER TREATMENT AND DISCHARGE OF GROUNDWATER TO PUBLICALLY OWNED TREATMENT WORKS (POTW) OR SURFACE WATER;

5. AND 5A. EXCAVATION, ON-SITE THERMAL TREATMENT (EX-SITU THERMAL DESORPTION), SOLIDIFICATION, AND ON-SITE BACKFILLING OF CONTAMINATED SOILS, ACTIVATED CARBON GROUND-WATER TREATMENT AND DISCHARGE TO POTW OR SURFACE WATER.

ALTERNATIVE 1: NO ACTION

CERCLA REQUIRES THAT THE "NO ACTION" ALTERNATIVE BE CONSIDERED AT EVERY

SITE AGAINST WHICH THE OTHER ALTERNATIVES ARE EVALUATED. UNDER THIS ALTERNATIVE NO PROVISIONS HAVE BEEN MADE FOR TREATMENT OR CONTAINMENT OF CONTAMINATED SOILS, SEDIMENTS, OR GROUNDWATER IDENTIFIED AT THE SITE.

THIS ALTERNATIVE WOULD NOT BE CONSIDERED PROTECTIVE OF HUMAN HEALTH AND

THE ENVIRONMENT BECAUSE IT WOULD NOT REDUCE THE UNACCEPTABLE RISKS POSED BY THE SITE WHEN EVALUATED UNDER A FUTURE RESIDENTIAL RISK SCENARIO. THE ONLY REDUCTION OF CONTAMINANT LEVELS WOULD OCCUR THROUGH NATURAL PROCESSES SUCH AS DISPERSION AND ATTENUATION. ALTERNATIVE 1 WOULD POSE SIGNIFICANT POTENTIAL FOR ADVERSE EFFECTS DUE TO THE FOLLOWING:

* CONTINUED POTENTIAL DIRECT CONTACT WITH PESTICIDES AND ARSENIC IN CONTAMINATED SOIL, SEDIMENT, AND BUILDINGS,;

* INCREASINGLY FREQUENT TRESPASSING ON THE SITE AS THE FENCE SURROUNDING IT DETERIORATES;

* CONTINUED PERCOLATION OF PESTICIDES FROM SOIL INTO GROUND WATER;

* GROUND WATER WOULD NOT BE RESTORED TO ITS BENEFICIAL USES;

* EROSION OF CONTAMINATED SOIL AND SEDIMENT CAUSING CONTAMINATION OF SURROUNDING AREAS;

* POTENTIAL FUTURE EXPOSURE TO GROUND WATER CONTAMINATED WITH PESTICIDES AND VOLATILE ORGANICS; AND

* POTENTIAL EXPOSURE TO CONTAMINATED SUBSURFACE SOIL IF IT IS BROUGHT TO THE SURFACE DURING DEVELOPMENT OF THE SITE.

GROUNDWATER MONITORING WOULD BE CONDUCTED EVERY FIVE (5) YEARS AT NINE OF THE EXISTING ON-SITE WELLS FOR AT LEAST THIRTY (30) YEARS. THE GROUNDWATER SAMPLES WOULD BE ANALYZED FOR THE TARGET COMPOUND LIST ORGANICS, PENTACHLOROPHENOL, PESTICIDES, HERBICIDES, AND THE TARGET ANALYTE LIST INORGANICS. ALSO TWO COMPOSITE BIOASSAYS WOULD BE PERFORMED ANNUALLY, ONE FROM WATER COLLECTED FROM ON SITE AND A SECOND FROM WATER COLLECTED DOWNGRADIENT OF THE SITE.

BECAUSE THE CONTAMINATED SOILS AND GROUND WATER WOULD REMAIN IN PLACE, UNTREATED, AT THE SITE, CERCLA REQUIRES THAT A 5-YEAR REVIEW OF DATA COLLECTED AT THE SITE BE EVALUATED AT LEAST EVERY FIVE YEARS TO ASSURE THAT A SELECTED REMEDY CONTINUES TO BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. DATA OBTAINED FROM THE GROUNDWATER MONITORING PROGRAM AND THE BIOASSAYS WOULD BE COMPILED AND REVIEWED ONCE, AT LEAST, EVERY FIVE YEARS FOR NO LESS THAN 30 YEARS. THE FINDINGS OF THE REVIEW COULD RESULT IN THE PERFORMANCE OF OTHER STUDIES AND/OR ACTIONS AS DEEMED NECESSARY BY EPA.

THE ESTIMATED CAPITAL COST OF THE REMEDY PRESENTED IN THIS ALTERNATIVE WOULD BE $21,685 AND THE ASSOCIATED O&M COSTS AND INDIRECT COSTS WOULD

BE $194,857 AND $32,481, RESPECTIVELY.

ALTERNATIVE 2: ON-SITE CLEANING, CAPS, LAND-USE RESTRICTIONS, AND FENCE MAINTENANCE AND MONITORING:

ANNUAL GROUND-WATER SAMPLING WOULD BE CONDUCTED AT NINE (9) OF THE EXISTING SITE MONITORING WELLS, AND FOUR (4) ADDITIONAL WELLS, WHICH WOULD BE INSTALLED AND SAMPLED IN ORDER TO MONITOR GROUNDWATER QUALITY AND TO FURTHER DEFINE THE EXTENT OF PLUME MIGRATION BEYOND THE SITE BOUNDARY. THESE WELLS WOULD BE ANALYZED FOR THE TARGET COMPOUND LIST ORGANICS, PENTACHLOROPHENOL, PESTICIDES, HERBICIDES, AND THE TARGET ANALYTE LIST INORGANICS. THE NEW WELLS WOULD BE PLACED BOTH ON SITE AND OFF SITE AND SCREENED THROUGHOUT THE AREA OF ATTAINMENT (I.E. THE ENTIRE GROUNDWATER PLUME EXCEPT THE AREA DIRECTLY BENEATH ANY WASTE THAT IS CONTAINED AND MANAGED ON SITE). AS PART OF THE GROUNDWATER MONITORING PROGRAM TWO COMPOSITE BIOASSAYS WOULD BE CONDUCTED ANNUALLY.

CONTAMINATED SITE SOILS AND SEDIMENT, PREVIOUSLY IDENTIFIED WITHIN THE 100-SQUARE FEET GRIDS EMPLOYED DURING THE RI, WOULD BE REGRIDDED. FIFTEEN-SQUARE FEET GRIDS WOULD BE SAMPLED TO FURTHER DEFINE THESE AREAS IN ORDER TO DETERMINE THE TOTAL VOLUME OF CONTAMINATED SOILS ON SITE. ADJACENT GRIDS TARGETED FOR REMEDIATION ACTIVITIES WOULD ALSO BE SAMPLED TO DETERMINE IF ANY PORTIONS OF THE ADJACENT COMPOSITED 100-SQUARE FEET GRIDS WERE ABOVE ACTION LEVELS.

SITE PROCESS BUILDINGS WOULD BE DECONTAMINATED AND DEMOLISHED, LEAVING THE FLOOR SLABS IN PLACE OVER WHICH A RCRA CAP WOULD BE CONSTRUCTED. SUBSURFACE SOILS CONTAINING HAZARDOUS SUBSTANCES ABOVE SUBSURFACE SOIL ACTION LEVELS WOULD BE EXCAVATED, CONSOLIDATED WITH CONTAMINATED SOLID WASTE FROM BUILDING-GRIT BLASTING, AND PLACED UNDER THE RCRA CAP. SURFACE SOILS CONTAINING HAZARDOUS SUBSTANCES ABOVE SURFACE SOIL CLEANUP LEVELS WOULD BE GRADED AND COMPACTED, COVERED WITH A WARNING BARRIER GRID AND A SILTY-CLAY CAP COVER, AND REVEGETATED. THE VOLUME OF SURFACE AND SUBSURFACE SOILS REQUIRING REMEDIATION IS ESTIMATED TO BE 24,000 CUBIC YARDS.

INSPECTION AND MAINTENANCE OF THE CAPS (BOTH RCRA CAP AND SOIL COVER) AND SITE CONDITIONS WOULD BE CONDUCTED ANNUALLY. LAND-USE RESTRICTIONS WOULD BE SOUGHT BY EPA THROUGH THE LOCAL MUNICIPAL GOVERNMENT TO IMPOSE ON THE SITE PROPERTY FOR AN INDEFINITE PERIOD OF TIME. EPA WOULD ALSO SEEK TO OBTAIN A GROUNDWATER USE RESTRICTION FROM THE MEMPHIS-SHELBY COUNTY HEALTH DEPARTMENT FOR THAT GROUND WATER DOWNGRADIENT OF THE SITE UNTIL GROUND WATER LEVELS NO LONGER EXCEEDED HEALTH BASED LEVELS. BECAUSE CONTAMINANTS WOULD BE LEFT ON SITE, A REVIEW OF THE SITE DATA COLLECTED ANNUALLY WOULD BE REVIEWED EVERY FIVE (5) YEARS FOR AT LEAST THIRTY (30) YEARS TO ASSURE THAT THE REMEDY CONTINUED TO BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THE FINDINGS OF THE REVIEWS COULD RESULT IN THE NEED TO PERFORM ADDITIONAL STUDIES AND/OR ACTIONS AT THE SITE.

THE ESTIMATED CAPITAL COST OF THE REMEDY PRESENTED IN THIS ALTERNATIVE WOULD BE $403,617 AND THE ASSOCIATED O&M COSTS AND INDIRECT COSTS WOULD BE $278,066 AND $80,723, RESPECTIVELY.

RESIDUALS

ONCE DECONTAMINATED, METALLIC AND NON-METALLIC BUILDING DEBRIS WOULD BE DISPOSED OF IN AN APPROPRIATE RECYCLING FACILITY AND/OR RCRA SUBTITLE C LANDFILL. SOLID WASTE AND WATER, RESULTING FROM GRIT BLASTING AND STEAM CLEANING THE BUILDINGS, WOULD BE COLLECTED AND DISPOSED OF IN A PROPER FACILITY.

ALTERNATIVE 3 AND 3A: EXCAVATION AND OFF-SITE THERMAL TREATMENT (INCINERATION) OF CONTAMINATED SOILS, OFF-SITE SOLIDIFICATION AND LANDFILL OF RESIDUAL CONTAMINATED SOILS AND BUILDING DEBRIS, ACTIVATED CARBON TREATMENT AND DISCHARGE OF CONTAMINATED GROUNDWATER TO POTW:

A MINIMUM OF FOUR (4) ADDITIONAL GROUNDWATER MONITORING WELLS WOULD BE INSTALLED AND SAMPLED IN CONJUNCTION WITH SAMPLING AT NINE (9) OF THE EXISTING SITE MONITORING WELLS. THE RESULTING DATA WOULD BE USED TO DESIGN A GROUNDWATER EXTRACTION SYSTEM AND TREATMENT FACILITY.

CONTAMINATED GROUND WATER WOULD BE PUMPED TO THE SURFACE FOR TREATMENT BY FILTRATION AND CARBON ADSORPTION AND LATER DISCHARGED TO THE CITY OF ARLINGTON PUBLICLY OWNED TREATMENT WORKS (POTW), AFTER THE FACILITY PRETREATMENT REQUIREMENTS HAVE BEEN MET, OR TO THE LOOSAHATCHIE RIVER CANAL UNDER NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT REQUIREMENTS.

* ALTERNATIVE 3 WOULD UTILIZE APPROXIMATELY FIFTEEN (15) EXTRACTION WELLS FOR REMOVAL OF CONTAMINATED GROUND WATER FROM ON SITE AND FROM THE DOWNGRADIENT AREA LOCATED BETWEEN THE SITE AND THE LOOSAHATCHIE RIVER CANAL. THE DAILY EFFLUENT FLOW RATE, FOLLOWING TREATMENT, WOULD BE APPROXIMATELY 43,200 GALLONS/DAY.

* ALTERNATIVE 3A WOULD INCORPORATE APPROXIMATELY EIGHT (8) EXTRACTION WELLS TO REMOVE CONTAMINATED GROUND WATER ON OR VERY CLOSE TO THE SITE AND WOULD NOT TREAT GROUNDWATER DOWNGRADIENT OF THE SITE. THE DAILY EFFLUENT FLOW RATE, FOLLOWING TREATMENT, WOULD BE APPROXIMATELY 23,040 GALLONS/DAY.

TEMPORARY GROUNDWATER USE RESTRICTIONS WOULD BE IMPOSED ON GROUND WATER AT AND DOWNGRADIENT OF THE SITE DURING THE REMEDIATION PERIOD BY LOCAL AUTHORITIES. PERFORMANCE EVALUATIONS OF THE GROUNDWATER REMEDIAL ACTION WILL BE CONDUCTED AS OUTLINED IN SECTION 7.5.

SITE SOILS AND SEDIMENT LOCATED IN KNOWN CONTAMINATED AREAS WOULD BE REGRIDDED (IN THE MANNER DESCRIBED FOR ALTERNATIVE 2) AND SAMPLED TO

FURTHER DELINEATE THE ESTIMATED TOTAL VOLUME OF CONTAMINATED SITE SOILS. EXCAVATED CONTAMINATED SITE SOILS, APPROXIMATELY 24,000 CUBIC YARDS, WOULD BE SHIPPED TO AN OFF-SITE LOCATION FOR THERMAL TREATMENT AT A RCRA PERMITTED HAZARDOUS WASTE INCINERATOR. TRANSPORTATION OF CONTAMINATED SOILS WILL BE IN COMPLIANCE WITH FEDERAL AND STATE REGULATIONS. AREAS

EXCAVATED WOULD BE BACKFILLED AND REVEGETATED.

CONTAMINATED SOILS IN EXCESS OF THE SOILS ACTION LEVELS WOULD BE EXCAVATED TO A DEPTH OF TWO FEET, AT ONE-FOOT INTERVALS. THE REMAINING EXCAVATION CELLS WOULD BE RESAMPLED, AND SHOULD SOILS IN THE NEXT LAYER EXCEED SOIL ACTION LEVELS, AN ADDITIONAL 12-INCHES WOULD BE EXCAVATED. THE PROCESS WOULD CONTINUE UNTIL ALL CONTAMINATED SOILS HAVE BEEN EXCAVATED.

SITE PROCESS BUILDINGS AND THE UNDERLYING CONCRETE FLOORING WOULD BE DECONTAMINATED, DEMOLISHED, AND REMOVED FOR OFF-SITE DISPOSAL IN ORDER TO FACILITATE IDENTIFICATION AND EXCAVATION OF CONTAMINATED SOILS LOCATED UNDERNEATH.

THE ESTIMATED PRESENT WORTH CAPITAL COST OF ALTERNATIVE 3 WOULD BE $21,536,644, WHILE THE ASSOCIATED O&M COSTS AND INDIRECT COSTS WOULD BE $15,504,031 AND $4,307,530, RESPECTIVELY. ALTERNATIVE 3A IS ESTIMATED TO HAVE A PRESENT WORTH CAPITAL COST OF $21,515,994 AND AN ESTIMATED PRESENT WORTH O&M COST AND INDIRECT COST OF $15,267,186 AND $4,3030,199, RESPECTIVELY.

RESIDUALS

CONTAMINATED WASTE RESULTING FROM MONITORING OR REMEDIAL ACTION ACTIVITIES WILL BE DRUMMED AND IF FOUND TO BE IN COMPLIANCE WITH ALL LDRS, THEY WOULD BE SENT TO AN APPROPRIATE RCRA FACILITY. OTHERWISE THE DRUMMED WASTES WOULD BE SENT TO A HAZARDOUS WASTE INCINERATOR. SOIL AND ASH CONTAINING SIGNIFICANT AMOUNTS OF ARSENIC OR OTHER TRACE METALS WOULD BE SOLIDIFIED AT AN OFF-SITE TREATMENT FACILITY.

DECONTAMINATED BUILDING DEBRIS WOULD BE PLACED IN AN APPROPRIATE RCRA LANDFILL FACILITY. GRANULATED ACTIVATED CARBON (GAC) FILTERS FROM THE TREATMENT PROCESS WILL BE EITHER REGENERATED AND REUSED OR SENT OFF SITE FOR THERMAL TREATMENT TO MEET RCRA REQUIREMENTS.

ALTERNATIVE 4 AND 4A: EXCAVATION AND ON-SITE THERMAL TREATMENT (INCINERATION) OF CONTAMINATED SOILS, ON-SITE SOLIDIFICATION AND BACKFILL OF CONTAMINATED SOILS AND OFF-SITE DISPOSAL OF BUILDING DEBRIS, ACTIVATED CARBON TREATMENT, AND DISCHARGE OF CONTAMINATED GROUNDWATER TO SURFACE WATER OR POTW:

AS IN ALTERNATIVES 3 AND 3A, SAMPLING DATA FROM A MINIMUM OF FOUR (4) NEW GROUNDWATER MONITORING WELLS AND NINE (9) OF THE EXISTING SITE MONITORING WELLS WOULD BE OBTAINED FOR THE DESIGN OF A GROUNDWATER EXTRACTION AND TREATMENT SYSTEM.

CONTAMINATED GROUNDWATER WOULD BE PUMPED TO THE ON-SITE TREATMENT FACILITY TO REMOVE PESTICIDES AND VOLATILES THROUGH FILTRATION AND CARBON ADSORPTION PRIOR TO DISCHARGE TO THE LOOSAHATCHIE RIVER CANAL OR THE LOCAL POTW IN COMPLIANCE WITH NPDES OR FACILITY PRETREATMENT

REQUIREMENTS. THE GROUNDWATER EXTRACTION SYSTEM, TREATED EFFLUENT FLOW

RATES, AND PERFORMANCE MONITORING PLAN PRESENTED FOR ALTERNATIVES 4 AND 4A ARE THE SAME AS ALTERNATIVES 3 AND 3A, RESPECTIVELY.

* ALTERNATIVE 4 WOULD UTILIZE APPROXIMATELY FIFTEEN (15) EXTRACTION WELLS FOR CONTAMINATED GROUNDWATER REMOVAL FROM ON SITE AND THE DOWNGRADIENT AREA LOCATED BETWEEN THE SITE AND THE LOOSAHATCHIE RIVER CANAL.

* ALTERNATIVE 4A WOULD UTILIZE APPROXIMATELY EIGHT (8) EXTRACTION WELLS TO REMOVE CONTAMINATED GROUNDWATER ON OR VERY CLOSE TO THE SITE AND WOULD NOT TREAT GROUNDWATER DOWNGRADIENT OF THE SITE.

LIKE ALTERNATIVES 2, 3, AND 3A, SITE SOILS AND SEDIMENT WOULD BE GRIDDED AND SAMPLED TO FURTHER DEFINE KNOWN CONTAMINATED AREAS IN ORDER TO DETERMINE THE TOTAL VOLUME OF SITE SOILS CONTAINING HAZARDOUS SUBSTANCES.

SITE PROCESS BUILDINGS AND THE UNDERLYING CONCRETE FLOORING WOULD BE DECONTAMINATED, DEMOLISHED, AND REMOVED FOR OFF-SITE DISPOSAL IN ORDER TO FACILITATE EXCAVATION OF CONTAMINATED SOILS.

AN ESTIMATED VOLUME OF 24,000 YD3 OF CONTAMINATED SITE SOILS WOULD BE EXCAVATED AND THEN THERMALLY TREATED IN AN ON-SITE HAZARDOUS WASTE INCINERATOR IN COMPLIANCE WITH ALL 40 CFR PART 264 PERFORMANCE STANDARDS AND PART 270.19 REQUIREMENTS TO CONDUCT A TRIAL BURN. RESIDUAL ASH WILL MEET RCRA LDRS BY MEETING BDAT STANDARDS OR TREATABILITY VARIANCE LEVELS WHERE APPROPRIATE. ANY TREATED MATERIAL WHICH DOES NOT MEET TREATMENT OBJECTIVES WOULD BE INCINERATED AGAIN (IF THE PROBLEM IS FROM ORGANICS) OR SOLIDIFIED (IF THE PROBLEM IS FROM POTENTIAL LEACHING OF INORGANICS). THE EXCAVATED AREAS WOULD BE BACKFILLED WITH ASH FROM THE INCINERATOR, COMPACTED, AND THEN REVEGETATED.

THIS ALTERNATIVE WILL COMPLY WITH LDR THROUGH A TREATABILITY VARIANCE UNDER 40 CFR 268.44(H) FOR THE CONTAMINATED SOILS AND DEBRIS THROUGH THE USE OF ON-SITE THERMAL DESTRUCTION (INCINERATION) TO ATTAIN THE AGENCY'S APPLICABLE INTERIM "TREATMENT LEVELS/RANGES". THE TREATMENT LEVELS/RANGES, WHICH WERE ESTABLISHED THROUGH A TREATABILITY VARIANCE FOR THE ON-SITE INCINERATOR UNIT, ARE PRESENTED IN TABLE 7.1.

TEMPORARY GROUNDWATER USE RESTRICTIONS WOULD BE IMPOSED ON GROUNDWATER AT AND DOWNGRADIENT OF THE SITE DURING THE REMEDIATION PERIOD. SUCH RESTRICTIONS WOULD BE IMPOSED THROUGH THE MEMPHIS AND SHELBY COUNTY

HEALTH DEPARTMENT (MSCHD) PERMITTING PROGRAM. PERFORMANCE EVALUATIONS OF THE GROUNDWATER REMEDIAL ACTION WILL BE CONDUCTED AS OUTLINED IN SECTION 7.5.

THE ESTIMATED PRESENT WORTH CAPITAL COST OF ALTERNATIVE 4 WOULD BE

$16,654,900 WHILE THE ASSOCIATED O&M COSTS AND INDIRECT COSTS WOULD BE $1,605,300 AND $3,664,100, RESPECTIVELY. ALTERNATIVE 4A IS ESTIMATED TO HAVE A PRESENT WORTH CAPITAL COST OF $16,632,200 AND AN ESTIMATED PRESENT WORTH O&M COST OF $1,409,000 AND INDIRECT COSTS OF $3,659,100.

RESIDUALS

SOLID WASTE FROM GROUNDWATER TREATMENT, BUILDING DECONTAMINATION, AND FROM RELATED SITE ACTIVITIES WOULD BE INCINERATED AND SOLIDIFIED (WHERE NECESSARY) ON SITE. ASH CONTAINING ARSENIC WOULD BE SOLIDIFIED ON SITE AND DISPOSED OF IN AN APPROPRIATE OFF-SITE RCRA LANDFILL. SOILS CONTAINING THERMALLY TREATED CONTAMINATED SOILS AND SOLID WASTES WOULD BE ANALYZED, AND IF FOUND TO BE BELOW SITE ACTION LEVELS WOULD BE BACKFILLED INTO EXCAVATION CELLS.

ALL DECONTAMINATED BUILDING DEBRIS WOULD BE SHIPPED OFF SITE FOR DISPOSAL IN AN APPROPRIATE RCRA LANDFILL, EXCEPT THE METALLIC DEBRIS WHICH WOULD BE RECYCLED. GAC FILTERS WILL BE REGENERATED OR THERMALLY TREATED TO MEET BEST DEMONSTRATED ACHIEVABLE TECHNOLOGY (BDAT) OR TREATABILITY VARIANCE LEVELS.

ONCE INCINERATION ACTIVITIES HAVE BEEN COMPLETED, THE REMAINING TREATED DECONTAMINATION FLUIDS MAY BE STORED IN 3,000 GALLON TANKS, TESTED, AND DISPOSED OF THROUGH THE GROUNDWATER TREATMENT SYSTEM AND DISCHARGED TO THE LOOSAHATCHIE RIVER CANAL OR THE LOCAL POTW, AFTER VERIFICATION THAT IT MEETS APPLICABLE CRITERIA FOR DISCHARGE.

RESIDUES WHICH CONTAIN OR WHICH ARE CONTAINING LISTED RCRA HAZARDOUS WASTE WOULD BE HANDLED IN THE MANNER OUTLINED IN SECTION 7.5.

ALTERNATIVE 5 AND 5A: EXCAVATION AND ON-SITE THERMAL TREATMENT (EX-SITU THERMAL DESORPTION), SOLIDIFICATION AND BACKFILL OF CONTAMINATED SOILS, ACTIVATED CARBON TREATMENT AND DISCHARGE OF CONTAMINATED GROUNDWATER TO SURFACE WATER OR LOCAL POTW:

THE PRELIMINARY IMPLEMENTATION OF ALTERNATIVES 5 AND 5A (AS IN ALTERNATIVES 3, 3A, 4, AND 4A) WOULD INVOLVE THE CONDUCT OF A DETAILED SOIL AND HYDROGEOLOGICAL SAMPLING PLAN TO FURTHER REFINE THE VOLUMETRIC ESTIMATES OF CONTAMINATED SOILS AND GROUNDWATER. ONCE TREATED, EXTRACTED CONTAMINATED GROUNDWATER WOULD BE PUMPED TO THE ARLINGTON POTW OR DISCHARGED TO THE LOOSAHATCHIE RIVER CANAL IN COMPLIANCE WITH APPROPRIATE REQUIREMENTS CITED IN ALTERNATIVES 3, 3A, 4, AND 4A. THE ESTIMATED EFFLUENT DISCHARGE RATES SPECIFIED IN ALTERNATIVES 3 AND 3A WOULD APPLY TO ALTERNATIVES 5 AND 5A, RESPECTIVELY.

* ALTERNATIVE 5 WOULD UTILIZE APPROXIMATELY FIFTEEN (15) EXTRACTION WELLS FOR CONTAMINATED GROUNDWATER REMOVAL FROM ON SITE AND FROM THE AREA DOWNGRADIENT LOCATED BETWEEN THE SITE AND THE LOOSAHATCHIE RIVER CANAL.

* ALTERNATIVE 5A WOULD UTILIZE APPROXIMATELY EIGHT (8) EXTRACTION WELLS TO REMOVE CONTAMINATED GROUNDWATER AT OR VERY CLOSE TO THE SITE AND WOULD NOT TREAT GROUNDWATER DOWNGRADIENT OF THE SITE.

TEMPORARY GROUNDWATER USE RESTRICTIONS WOULD BE REQUIRED AT AND DOWNGRADIENT OF THE SITE DURING THE REMEDIATION PERIOD. ENFORCEMENT OF THESE RESTRICTIONS WOULD BE IMPLEMENTED THROUGH THE EXISTING MSCHD PERMITTING PROGRAM.

PERFORMANCE EVALUATIONS WOULD BE CONDUCTED NO LESS THAN EVERY FIVE YEARS DURING THE GROUNDWATER REMEDIAL ACTION OR UNTIL CONTAMINANT CONCENTRATIONS IN GROUNDWATER NO LONGER EXCEED HEALTH-BASED LEVELS. THE EVALUATIONS WOULD CONTINUE UNTIL THE COMPLETION OF THE GROUNDWATER REMEDIAL ACTION AND WOULD SERVE TO INDICATE WHETHER CLEANUP LEVELS HAVE BEEN OR WILL BE ATTAINED.

CONTAMINATED SITE SOILS, ESTIMATED AT 24,000 YD3, WOULD BE EXCAVATED AND THEN THERMALLY TREATED IN AN ON-SITE EX-SITU DESORPTION UNIT TO REMOVE ORGANICS CONTAMINATION. THOSE SOILS FOUND TO BE CONTAMINATED WITH LISTED WASTES CODED F021 OR F027 WILL BE SEGREGATED PRIOR TO TREATMENT. THE EXCAVATION CELLS WOULD BE BACKFILLED AND COMPACTED WITH THE TREATED SOILS, ONCE TREATABILITY VARIANCE LEVELS HAVE BEEN MET, AND THEN REVEGETATED.

THIS ALTERNATIVE WILL COMPLY WITH THE LDR THROUGH A TREATABILITY VARIANCE, PURSUANT TO 40 CFR 268.44(H), FOR THE WASTES THAT CANNOT BE TREATED TO MEET THE APPLICABLE LDR, BECAUSE EXISTING AND AVAILABLE DATA DO NOT DEMONSTRATE THAT THE FULL-SCALE OPERATION OF THIS TREATMENT TECHNOLOGY CAN ATTAIN THE LDR TREATMENT STANDARDS CONSISTENTLY FOR ALL SOIL AND DEBRIS WASTES TO BE ADDRESSED BY THIS ACTION. THE TREATMENT LEVEL RANGES, WHICH WERE ESTABLISHED THROUGH A TREATABILITY VARIANCE THAT THE EX-SITU THERMAL DESORPTION UNIT, ARE SHOWN IN TABLE 7.1.

ONCE SOILS CONTAINING LISTED RCRA WASTES HAVE BEEN DECONTAMINATED BY REDUCING CONTAMINANT CONCENTRATIONS TO BELOW HEALTH BASED LEVELS THEY WILL BE DELISTED UNDER CERCLA AND, THEREFORE, WILL MEET RCRA'S SUBSTANTIVE REQUIREMENTS.

AS IN THE OTHER THERMAL TREATMENT ALTERNATIVES, SITE PROCESS BUILDINGS AND UNDERLYING CONCRETE FLOORING WOULD BE DECONTAMINATED AND DEMOLISHED IN ORDER TO SAMPLE AND EXCAVATE CONTAMINATED SOILS LOCATED UNDERNEATH THE CONCRETE SLABS.

THE ESTIMATED PRESENT WORTH CAPITAL COST OF ALTERNATIVE 5 WOULD BE

$8,253,800, WHILE THE ASSOCIATED O&M COSTS AND INDIRECT COSTS WOULD BE $1,605,300 AND 2,311,100, RESPECTIVELY. ALTERNATIVE 5A IS ESTIMATED TO HAVE A PRESENT WORTH CAPITAL COST OF $8,231,000, AN ESTIMATED PRESENT WORTH O&M COST OF $1,381,800, AND A TOTAL INDIRECT COST OF $2,304,700.

RESIDUALS

WASTE RESULTING FROM THE IMPLEMENTATION OF ALTERNATIVES 5 AND 5A WOULD BE DISPOSED OF IN THE MANNER OUTLINED FOR ALTERNATIVES 4 AND 4A, EXCEPT FOR THOSE DISPOSAL REQUIREMENTS THAT ARE THE DIRECT RESULT OF INCINERATION. THOSE SOILS CONTAINING ARSENIC OR OTHER TRACE METALS IN SIGNIFICANT LEVELS (ABOVE BACKGROUND) WILL BE SOLIDIFIED ON SITE AND LATER DISPOSED OF AT AN OFF-SITE FACILITY.

THE THERMAL DESORPTION TREATMENT MAY GENERATE CONDENSED ORGANIC LIQUIDS WHICH WILL BE DISPOSED OF IN AN APPROPRIATE OFF-SITE RCRA FACILITY. OTHER RESIDUALS, SUCH AS ORGANIC PHASE LIQUIDS, SLUDGES, AND SPENT CARBON, WILL ALSO REQUIRE FURTHER TREATMENT BY INCINERATION OR OFF-SITE DISPOSAL.

RESIDUES FROM THE THERMAL TREATMENT OF SOILS AND TREATMENT OF GROUNDWATER, WHICH CONTAIN OR WHICH ARE LISTED HAZARDOUS WASTES, WOULD BE SUBJECT TO THE DELISTING PROCESS (40 CFR 260.20 AND .22) AS APPROPRIATE OR DISPOSED OF AT AN OFF-SITE RCRA FACILITY. BECAUSE EXISTING DATA SHOW THAT SITE SOILS CONTAINING PCP CONTAIN DIOXIN/FURAN CONGENERS IN LOW LEVELS THAT WOULD NOT BE CONSIDERED HAZARDOUS (I.E., ARE PRESENT IN CONCENTRATIONS BELOW HEALTH BASED LEVELS), EPA WILL ATTEMPT TO DELIST THESE RESIDUAL MATERIALS DURING REMEDIAL DESIGN. THEREFORE, IF RCRA SUBTITLE C REQUIREMENTS ARE FOUND NOT TO BE ARARS, THE RESIDUAL MATERIALS WOULD BE MANAGED AS SOLID WASTES UNDER RCRA SUBTITLE D {AND STATE OF TENNESSEE SOLID WASTE DISPOSAL REQUIREMENTS}.

IF TESTING OF THE WASTE DURING THE REMEDIAL ACTION SHOWS THAT THE NECESSARY LEVELS ARE NOT BEING ATTAINED FOR DELISTING THESE WASTES, THEY WILL BE MANAGED AS SUBTITLE C HAZARDOUS WASTES AND THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS UNDER SUBTITLE C WILL BE MET. TEMPORARY STORAGE OF RESIDUAL MATERIALS MAY BE NECESSARY PRIOR TO DISPOSAL AT AN APPROPRIATE RCRA FACILITY. RESIDUALS WILL BE TREATED TO TREATABILITY VARIANCE LEVELS PRIOR TO DISPOSAL IN AN OFF-SITE RCRA FACILITY.

#SCAA
SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

EPA'S SELECTED ALTERNATIVE IS ALTERNATIVE 5, ALONG WITH ALTERNATIVE 4 AS A CONTINGENCY ALTERNATIVE, FOR REMEDIATION OF SOIL AND GROUNDWATER AT THE ARLINGTON BLENDING AND PACKAGING SITE. BOTH OF THESE ALTERNATIVES INVOLVE EXTRACTION AND TREATMENT OF THE CONTAMINATED GROUNDWATER VIA APPROXIMATELY FIFTEEN (15) EXTRACTION WELLS (EXACT NUMBER WILL BE

DETERMINED DURING THE REMEDIAL DESIGN). THE FINAL DECISION AS TO DISCHARGE OF WATER TO EITHER THE LOCAL POTW OR THE NEARBY LOOSAHATCHIE RIVER CANAL WILL BE MADE DURING REMEDIAL DESIGN (RD). BOTH OF THESE ALTERNATIVES UTILIZE THERMAL TREATMENT OF CONTAMINATED SOILS AND DEBRIS (INCLUDING TREATMENT RESIDUALS) AS A MEANS OF SOILS REMEDIATION, BUT

DIFFER IN THE PROCESS OPTION (TECHNOLOGY TYPE) USED TO IMPLEMENT THE REMEDIAL TECHNOLOGY. ALTERNATIVE 5 INVOLVES THE USE OF EX-SITU THERMAL DESORPTION, AN INNOVATIVE TECHNOLOGY, TO REMOVE CONTAMINANTS FROM SITE SOILS, WHILE 4 INVOLVES TREATMENT OF SOILS VIA AN ON-SITE HAZARDOUS WASTE INCINERATOR. TABLE 8.1 PRESENTS THE SUMMARY OF THE DETAILED ANALYSIS FOR EACH OF THE REMEDIAL ALTERNATIVES.

OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT ADDRESSES WHETHER OR NOT A REMEDY PROVIDES ADEQUATE PROTECTION AND DESCRIBES HOW RISKS ARE ELIMINATED, REDUCED, OR CONTROLLED THROUGH TREATMENT, ENGINEERING CONTROLS, OR INSTITUTIONAL CONTROLS. CRITERIA USED TO EVALUATE THE PROTECTIVENESS OF AN ALTERNATIVE INCLUDED THE FOLLOWING: (1) CANCER RISKS FROM EXPOSURE TO SOIL OF LESS THAN 1 X (10-5), ON-SITE, AND 1 X (10-6), OFF-SITE; (2) NO SIGNIFICANT RISKS OF THRESHOLD TOXIC EFFECTS (HI LESS THAN 1) UNDER REASONABLE MAXIMUM EXPOSURE; AND (3) NO SIGNIFICANT RISK OF ADVERSE EFFECTS ON THE ENVIRONMENT.

ALL ALTERNATIVES, EXCEPT FOR "NO ACTION", WOULD BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. THE "NO ACTION" ALTERNATIVE IS NOT PROTECTIVE BECAUSE IT WOULD NOT PREVENT UNACCEPTABLE RISK FROM SOIL EXPOSURE IN CERTAIN LAND USE SCENARIOS, AND IT WOULD ALLOW OFF-SITE MIGRATION OF CONTAMINANTS LEADING TO POSSIBLE INGESTION OF WATER FROM WELLS DRILLED INTO THE SURFICIAL AQUIFER, RESULTING IN UNACCEPTABLE RISK LEVELS. ALSO, ALTERNATIVE 1 DOES NOT INVOLVE CONTAINMENT OR TREATMENT OF SITE SOILS, WHICH COMPRISE ONE OF THE PRINCIPLE THREATS THROUGH DERMAL EXPOSURE AND INGESTION OF THESE SOILS.

THE OTHER ALTERNATIVES ARE PROTECTIVE BECAUSE THEY PREVENT DIRECT EXPOSURE TO CONTAMINATED SOILS THROUGH EITHER CAPPING AND FENCING (ALTERNATIVE 2) OR THERMAL TREATMENT (THE OTHERS). ALTERNATIVE 2 WOULD SIGNIFICANTLY REDUCE FURTHER EXPOSURE TO GROUNDWATER CONTAMINATION THROUGH MONITORING, GROUNDWATER USE CONTROLS, AND THE INSTALLATION OF A RCRA CAP AND GROUND COVER (WHICH WOULD PREVENT LEACHATE FORMATION). THE OTHER ALTERNATIVES WOULD EMPLOY BOTH GROUNDWATER USE RESTRICTIONS AND PUMP-AND-TREAT METHODS.

OVERALL, ALTERNATIVES 3, 3A, 4, 4A, 5, AND 5A PROVIDE A HIGHER LEVEL OF LONG-TERM PROTECTION THAN ALTERNATIVE 2 BECAUSE THE MOST CONTAMINATED MATERIAL IS SIGNIFICANTLY DECONTAMINATED IN THESE ALTERNATIVES, WHILE MAINTENANCE IS REQUIRED TO ASSURE THE EFFECTIVENESS OF THE RCRA CAP AND LAND-USE CONTROLS IN ALTERNATIVE 2. GROUNDWATER CONTAMINATION WOULD SPREAD MORE UNDER ALTERNATIVE 2 THAN UNDER ALTERNATIVES 3A AND 4A, RENDERING ALTERNATIVE 2 LESS PROTECTIVE THAN ALTERNATIVES 3A AND 4A. ALTERNATIVES 3A, 4A, AND 5A PROVIDE LESS OVERALL PROTECTION THAN ALTERNATIVES 3, 4, AND 5 BECAUSE THEY ALLOW DOWNGRADIENT GROUNDWATER

POLLUTION TO SPREAD MORE THAN ALTERNATIVES 3, 4, AND 5.

COMPLIANCE WITH ARARS ADDRESSES WHETHER OR NOT A REMEDY WILL MEET ALL OF THE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS OF OTHER ENVIRONMENTAL STATUTES AND/OR PROVIDE GROUNDS FOR INVOKING A WAIVER.

THE IDENTIFIED ARARS FOR THIS SITE ARE LISTED IN SECTION 10.2.

SOILS CONTAINING LISTED RCRA HAZARDOUS WASTES, IN ALTERNATIVES 3, 4, AND 5, WOULD BE DECONTAMINATED BY REDUCING CONCENTRATIONS OF CONTAMINANTS BELOW THAT OF HEALTH BASED LEVELS, AND WOULD THEREBY BE DELISTED UNDER CERCLA BY MEETING THE SUBSTANTIVE REQUIREMENTS OF RCRA {40 CFR 260.20 AND .22}.

ALTERNATIVES 3, 4, AND 5 WOULD REDUCE THE LEVELS OF CONTAMINANTS IN THE GROUNDWATER AND COMPLY WITH THE SAFE DRINKING WATER ACT (SDWA) BY MEETING APPLICABLE MCLS. ALTERNATIVES 3A, 4A, AND 5A WOULD MEET GROUNDWATER ARARS ONCE CONTAMINANT CONCENTRATIONS IN THE PORTIONS OF THE PLUME LOCATED DOWNGRADIENT OF THE SITE HAVE BEEN REDUCED THROUGH NATURAL ATTENUATION.

TREATED WATER, FROM THE ON-SITE EXTRACTION SYSTEM DESCRIBED FOR ALTERNATIVES 3, 3A, 4, 4A, 5 AND 5A WOULD BE EITHER DISCHARGED TO THE POTW OR TO THE LOOSAHATCHIE RIVER CANAL AND WOULD MEET THE RESPECTIVE PRETREATMENT OR NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PERMITTING LIMITS.

ALTERNATIVE 2 COULD MEET RCRA LANDFILL CLOSURE REQUIREMENTS FOR CLOSURE WITH WASTE IN PLACE, HOWEVER, GROUNDWATER ARARS WOULD NOT BE ADDRESSED. THE "NO-ACTION" ALTERNATIVE (ALTERNATIVE 1) WOULD NOT MEET RCRA LANDFILL CLOSURE REQUIREMENTS.

THE LDRS ARE ARARS FOR SIX (6) OF THE EIGHT (8) REMEDIAL ALTERNATIVES BEING CONSIDERED (ALL EXCEPT FOR 1 AND 2). EACH OF THE SIX (6) ALTERNATIVES WOULD COMPLY WITH LDRS THROUGH A TREATABILITY VARIANCE OR BY MEETING BDAT STANDARDS OR TREATABILITY VARIANCE LEVELS FOR BOTH ON-SITE AND OFF-SITE CERCLA RESPONSE ACTIONS.

REDUCTION OF TOXICITY, MOBILITY, OR VOLUME IS THE ANTICIPATED PERFORMANCE OF THE TREATMENT TECHNOLOGIES A REMEDY MAY EMPLOY. EACH OF THE ALTERNATIVES EXCEPT 1 AND 2 EMPLOYS TREATMENT TECHNOLOGIES THAT PERMANENTLY AND SIGNIFICANTLY REDUCE TOXICITY, VOLUME, AND MOBILITY OF GROUNDWATER CONTAMINATION BY TREATING THE PLUME AND BY ELIMINATING CONTAMINATED S-OILS THAT ACT AS A SOURCE FOR CONTAMINANT LEACHING.

ALTERNATIVES 3, 3A, 4, 4A, 5, AND 5A REDUCE THE VOLUME AND TOXICITY OF SOIL AND GROUND WATER CONTAMINATED WITH ORGANIC CONTAMINANTS AND THE MOBILITY OF CONTAMINANTS IN SOIL THROUGH THE USE OF EFFECTIVE AND PERMANENT TREATMENT TECHNOLOGIES. ALTERNATIVES 3(AND 3A), 4(AND 4A), AND 5(AND 5A) EACH EMPLOY THERMAL TREATMENT TO EITHER PERMANENTLY DESTROY PESTICIDE AND OTHER ORGANIC CONTAMINANTS FOUND IN THE SOILS (3,

3A, 4, AND 4A) OR INDUCE PHYSICAL SEPARATION OF PESTICIDE AND OTHER ORGANIC CONTAMINANTS FROM SOILS (5 & 5A) FOR SUBSEQUENT TREATMENT. IN ALTERNATIVES 5 AND 5A, ONCE PHYSICAL SEPARATION OF ORGANIC CONTAMINANTS FROM SITE SOILS HAS BEEN ACHIEVED, PROCESS WATER WOULD BE FURTHER TREATED IN THE SITE WASTEWATER TREATMENT FACILITY. THE OFFGAS WOULD BE

FURTHER SCRUBBED BY PASSING IT THROUGH BEDS OF ACTIVATED CARBON BEFORE RELEASE TO THE ATMOSPHERE.

IN ALTERNATIVES 3 (AND 3A), 4 (AND 4A), AND 5 (AND 5A) PUMP AND TREAT TECHNIQUES WOULD BE EMPLOYED TO REMOVE CONTAMINANTS CONTAINED IN THE AREA OF ATTAINMENT TO LEVELS THAT ARE CONSISTENT WITH SITE ARARS. LESS GROUND WATER WOULD BE TREATED FOR ALTERNATIVES 3A, 4A, AND 5A COMPARED TO 3, 4, AND 5, RENDERING ALTERNATIVES 3A, 4A, AND 5A LESS EFFECTIVE IN REDUCING THE TOXICITY, MOBILITY AND VOLUME OF CONTAMINATED GROUND WATER (LOCATED DOWNGRADIENT OF THE SITE) THAN ALTERNATIVES 3, 4, AND 5. ALTERNATIVES 3A, 4A, AND 5A ARE, HOWEVER, MORE EFFECTIVE THAN ALTERNATIVE 2 AT REDUCING THE TOXICITY, MOBILITY, AND VOLUME OF CONTAMINATED GROUND WATER.

UNDER ALTERNATIVE 2, ACCESS WITHIN SITE BOUNDARIES WOULD BE RESTRICTED AND THE RCRA CAP AND SOIL COVER WOULD SERVE TO PREVENT EXPOSURE TO SITE SOILS AND ALSO TO REDUCE THE MOBILITY OF LEACHATE THROUGH THE CONTAMINATED SOILS. IT WOULD ALSO RESTRICT THE USE OF CONTAMINATED GROUND WATER. BUT, THESE REMEDIATION MEASURES WOULD DO NOTHING TO REDUCE THE VOLUME OR TOXICITY OF THE CONTAMINATED SOIL OR GROUND WATER.

ALTERNATIVE 1 WOULD PROVIDE NO REDUCTION IN THE CURRENT CONTAMINANT TOXICITY, MOBILITY OR VOLUME. RISKS TO HUMAN HEALTH WOULD REMAIN UNACCEPTABLE.

LONG-TERM EFFECTIVENESS AND PERMANENCE REFERS TO THE ABILITY TO MAINTAIN RELIABLE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT OVER TIME ONCE CLEANUP GOALS HAVE BEEN MET. LONG-TERM EFFECTIVENESS AND PERMANENCE WOULD BE ATTAINED BY EACH OF THE ALTERNATIVES, EXCEPT ALTERNATIVES 1 AND 2, THROUGH EXTRACTION AND TREATMENT OF CONTAMINATED GROUNDWATER AND THERMAL TREATMENT OF SITE SOILS. ALTERNATIVES 3 (AND 3A), 4 (AND 4A) OR 5 (AND 5A) WOULD EACH ACHIEVE THE CLEANUP LEVELS, THEREBY REDUCING THE RISK ASSOCIATED WITH SOILS AND GROUNDWATER AT THE SITE, AND WOULD THUS PROVIDE LONG-TERM EFFECTIVENESS AND PERMANENCE. THESE ALTERNATIVES EMPLOY REMEDIATION TECHNIQUES IN WHICH CONTAMINATED MEDIA ARE SIGNIFICANTLY DECONTAMINATED THROUGH THERMAL TREATMENT OF CONTAMINATED SOILS AND PUMP AND TREAT OF CONTAMINATED GROUND WATER. LONG-TERM MAINTENANCE IS REQUIRED TO INSURE THE EFFECTIVENESS OF THE RCRA CAP AND LAND-USE CONTROLS THAT WOULD BE EMPLOYED IN ALTERNATIVE 2. THE "NO ACTION" ALTERNATIVE OFFERS NO LONG-TERM EFFECTIVENESS OR PERMANENCE.

ALTERNATIVES 3(AND 3A), 4(AND 4A), AND 5(AND 5A) PROVIDE GREATER LONG-TERM EFFECTIVENESS AND PERMANENCE THAN ALTERNATIVE 2 BECAUSE THESE ALTERNATIVES WOULD RESTORE SITE GROUND WATER THROUGH TREATMENT, WHILE ALTERNATIVE 2 WOULD LEAVE CONTAMINATED SITE GROUND WATER TO NATURALLY

ATTENUATE. THE LARGER THE VOLUME OF CONTAMINATED GROUND WATER LEFT UNTREATED THE GREATER THE PROBABILITY THAT PEOPLE COULD BE EXPOSED TO CONTAMINATED GROUND WATER. ALTERNATIVE 2 WOULD SIGNIFICANTLY REDUCE FURTHER LEACHING OF CONTAMINANTS FROM SOILS TO GROUND WATER THROUGH SOLIDIFICATION OF SOURCE SOILS AND PLACEMENT IN A RCRA CAP.

ALTERNATIVES 3A, 4A, AND 5A WOULD BE LESS EFFECTIVE THAN ALTERNATIVES 3, 4, AND 5 BECAUSE THESE ALTERNATIVES WOULD NOT ACTIVELY REMEDIATE SITE GROUND WATER LOCATED DOWNGRADIENT OF THE SITE AND THUS CONTAMINATED GROUND WATER (LOCATED DOWNGRADIENT OF THE SITE) WOULD BE LEFT TO MIGRATE TO THE PROBABLE DISCHARGE POINT, THE LOOSAHATCHIE RIVER CANAL, UNTREATED.

THESE ALTERNATIVES -3(AND 3A), 4(AND 4A), AND 5(AND 5A)- WOULD EACH INCLUDE PROVISIONS THAT WOULD INHIBIT PUBLIC EXPOSURE TO SITE GROUND WATER, THAT EXCEEDS DRINKING WATER STANDARDS. THE POSSIBILITY OF EXPOSURE TO CONTAMINATED GROUND WATER WOULD REMAIN (DESPITE THE EXISTENCE OF GROUNDWATER-USE CONTROLS) SHOULD GROUNDWATER-USE RESTRICTIONS NOT BE COMPLIED WITH AND/OR ENFORCED.

GROUNDWATER USE CONTROLS WOULD BE REQUIRED FOR UP TO 30 YEARS FOR ALTERNATIVES 3, 4 AND 5, AFTER WHICH DRINKING WATER STANDARDS WOULD BE MET AS A RESULT OF THE TREATMENT PROGRAM. ALTERNATIVES 3A, 4A, AND 5A WOULD NOT ACHIEVE COMPLIANCE WITH DRINKING WATER STANDARDS UNTIL YEARS AFTER ALTERNATIVES 3, 4, AND 5 ACHIEVE COMPLIANCE, AND ALTERNATIVE 2 WOULD TAKE LONGER STILL.

ALTERNATIVES 2, 3(AND 3A), 4(AND 4A), AND 5(AND 5A) WOULD EACH REDUCE THE REASONABLE MAXIMUM POTENTIAL CANCER RISKS, RESULTING FROM SITE SOILS, TO THE SAME DEGREE. FOR THESE ALTERNATIVES, THE REASONABLE MAXIMUM RISK TO FUTURE ON-SITE RESIDENTS FROM EXPOSURE TO CONTAMINATED SOIL WOULD BE LESS THAN 1 X (10-5); AND THE MAXIMUM RISK TO OFF-SITE RESIDENTS WOULD BE LESS THAN 1 X (10-6). ALTERNATIVE 2 WOULD REDUCE THE RISK FROM INCIDENTAL SOIL INGESTION THROUGH SOLIDIFICATION AND CAPPING OF CONTAMINATED SOILS. IN ADDITION, THESE ALTERNATIVES WOULD REDUCE THE MAXIMUM HAZARD INDEX FROM SITE-RELATED POLLUTANTS TO LESS THAN ONE, ELIMINATING SIGNIFICANT RISKS OF THRESHOLD TOXIC EFFECTS.

ALTERNATIVE 1 WOULD DO NOTHING TO ELIMINATE RISKS FROM EXPOSURE TO PESTICIDES AND ARSENIC CONTAMINATED SURFACE SOIL ASSOCIATED WITH THE SITE, NOR WOULD IT ELIMINATE SIGNIFICANT RISKS FROM EXPOSURE TO PESTICIDES AND VOLATILE ORGANIC CONTAMINANTS IN GROUND WATER, IF IT IS USED. THESE RISKS INCLUDE, FOR AVERAGE EXPOSURE:

* A FUTURE 1 X (10-4) UPPERBOUND INDIVIDUAL RISK OF CANCER FROM EXPOSURE TO CONTAMINATED SOIL TO ON-SITE WORKERS;

* A CURRENT 2 X (10-6) UPPERBOUND INDIVIDUAL RISK OF CANCER FROM EXPOSURE TO CHLORDANE IN OFF-SITE SOIL AND SEDIMENT TO TENNESSEE DOT WORKERS;

* A CURRENT HAZARD INDEX OF 3 AND A CANCER RISK OF 2 X (10-5) FROM EXPOSURE OF CHILDREN TO CONTAMINATED SOIL IN OFF-SITE RESIDENTIAL AREAS;

* THE MAXIMUM UPPERBOUND INDIVIDUAL CANCER RISK WOULD BE 1 X (10-3) AND THE ASSOCIATED NON-CANCER RISK WOULD BE 46 TO ON-SITE CHILDREN UNDER THE RESIDENTIAL SCENARIO.

ALTERNATIVES 3, 4, AND 5 WOULD REQUIRE NO LONG TERM ON-SITE MAINTENANCE AND ARE BOTH PERMANENT, ASSUMING THAT THE SOLIDIFICATION OF ARSENIC CONTAMINATED SOIL IS PERMANENT. ALTERNATIVES 3A AND 4A WOULD NOT SIGNIFICANTLY REDUCE CONTAMINANT CONCENTRATIONS TO ACCEPTABLE LEVELS UNTIL DILUTION AND NATURAL REMOVAL MECHANISMS HAVE REDUCED DOWNGRADIENT GROUNDWATER CONTAMINANT CONCENTRATIONS TO ACCEPTABLE LEVELS, AFTER WHICH THEY WOULD BE AS PERMANENT AS ALTERNATIVES 3 AND ALTERNATIVE 4.

MAINTENANCE IS REQUIRED TO INSURE THE LONG-TERM EFFECTIVENESS OF THE CAPS IN ALTERNATIVE 2. LAND-USE CONTROLS MUST ALSO BE ENFORCED FOR ALTERNATIVE 2 TO BE EFFECTIVE. WITH PROPER MAINTENANCE, CAPS CAN BE CONSIDERED TO BE PERMANENT, AND WITH PROPER MONITORING AND ENFORCEMENT, LAND-USE CONTROLS CAN BE CONSIDERED TO BE PERMANENT. BECAUSE WASTE WOULD BE LEFT IN PLACE ABOVE HEALTH BASED LEVELS, A REVIEW WOULD BE CONDUCTED EVERY 5 YEARS UNDER BOTH ALTERNATIVES 1 AND 2 FOR AT LEAST 30 YEARS. THE OTHER ALTERNATIVES WOULD REQUIRE THAT EVALUATION REPORTS BE PREPARED, NO LESS THAN EVERY FIVE YEARS, THROUGH AT LEAST THE FIFTH YEAR FOLLOWING COMPLETION OF GROUNDWATER RESPONSE ACTION.

SHORT-TERM EFFECTIVENESS ADDRESSES THE PERIOD OF TIME NEEDED TO ACHIEVE PROTECTION AND ANY ADVERSE IMPACTS ON HUMAN HEALTH AND THE ENVIRONMENT THAT MAY BE POSED DURING THE CONSTRUCTION AND IMPLEMENTATION PERIOD UNTIL CLEANUP GOALS ARE ACHIEVED.

ALTERNATIVE 1 WOULD HAVE LITTLE IMPACT UPON THE SURROUNDING COMMUNITY, WORKERS DURING IMPLEMENTATION OF THE ON-SITE ACTIVITIES, AND THE ENVIRONMENT AND WOULD REQUIRE THE SHORTEST PERIOD OF TIME TO IMPLEMENT. SINCE THE "NO-ACTION" ALTERNATIVE INVOLVES NO ON-SITE ACTIVITIES OTHER THAN LIMITED ANNUAL MONITORING, NO RISKS TO HUMAN HEALTH OR THE ENVIRONMENT IS PROBABLE FROM PERFORMING SITE REMEDIAL ACTION CONSTRUCTION ACTIVITIES.

SHORT-TERM RISKS FROM ALTERNATIVE 2 ARE HIGHER THAN THOSE ASSOCIATED WITH THE "NO-ACTION" ALTERNATIVE BECAUSE OF THE RISK ASSOCIATED WITH CONSOLIDATION OF CONTAMINATED SOIL, RISKS FROM EMISSIONS DURING BUILDING DECONTAMINATION, AND RISKS DURING INSTALLATION, INSPECTION, AND MAINTENANCE OF THE CAPS.

ALTERNATIVE 2 WOULD REQUIRE APPROXIMATELY 24 MONTHS TO EXCAVATE AND SOLIDIFY CONTAMINATED SOIL FOR CONSTRUCTION OF A RCRA CAP AND FOR DECONTAMINATION, DEMOLITION, AND OFF-SITE TRANSPORTATION OF BUILDING

DEBRIS. DURING THIS PERIOD CONTAMINATED SOIL AND GROUND WATER WOULD BE MAPPED. ANNUAL GROUNDWATER MONITORING WOULD BE CARRIED OUT OVER A THIRTY YEAR PERIOD.

SHORT-TERM RISKS DURING IMPLEMENTATION OF ALTERNATIVES 3 (AND 3A) ARE

HIGHER THAN FOR ALTERNATIVE 2 DUE TO THE INCREASED HANDLING OF CONTAMINATED MATERIAL DURING SCREENING, PACKING AND LONG RANGE TRANSPORTATION, ALONG WITH OFF-SITE RISKS DUE TO EMISSIONS FROM THE CHOSEN TREATMENT FACILITY.

ALTERNATIVE 5(AND 5A) WOULD PRESENT GREATER RISKS THAN ALTERNATIVES 1, 2, AND 3(AND 3A) BUT LOWER THAN THAT OF ALTERNATIVE 4(AND 4A) BECAUSE CONTAMINANTS WOULD NOT BE BROUGHT INTO DIRECT CONTACT WITH A FLAME OR WITH FUEL COMBUSTION PRODUCTS AND LOW OFF-GAS FLOW. THE LIKELIHOOD OF ADVERSE IMPACTS TO THE COMMUNITY FROM THE ON-SITE TREATMENT IS CONSIDERED VERY LOW.

THE RISKS TO THE MARY ALICE DRIVE COMMUNITY, THE DOT FACILITY WORKERS, AND THE ON-SITE WORKERS DURING IMPLEMENTATION ARE HIGHEST FOR ALTERNATIVE 4 (AND 4A), DUE TO THE ON-SITE TREATMENT OF CONTAMINATED SOIL AND SOLID WASTE, ALONG WITH ON-SITE ACTIVITIES SIMILAR TO THOSE ASSOCIATED WITH ALTERNATIVE 3. HOWEVER, THE LIKELIHOOD OF ADVERSE IMPACTS TO THE COMMUNITY FROM THESE ACTIVITIES IS CONSIDERED TO BE LOW. EXCESSIVE AIR POLLUTION EMISSIONS ARE UNLIKELY WITH THE REPRESENTATIVE AIR POLLUTION CONTROL MEASURES DESCRIBED. ALSO, SUCH EMISSIONS CAN BE DETECTED VERY QUICKLY WITH STANDARD INDUSTRIAL HYGIENE MONITORING, VISIBLE EMISSION MONITORING FOR FUGITIVE EMISSIONS, AND STACK MONITORING INSTRUMENTS NORMALLY ASSOCIATED WITH HAZARDOUS WASTE INCINERATORS. BASED ON PAST EXPERIENCE WITH SIMILAR INCINERATION APPLICATIONS, MAXIMUM INDIVIDUAL RISKS OF CANCER FROM EMISSIONS ASSOCIATED WITH ALTERNATIVES 4 AND 4A ARE EXPECTED TO BE LESS THAN (10-5).

FOR ALL TREATMENT TECHNOLOGIES, WORKERS ARE NOT EXPECTED TO BE ADVERSELY IMPACTED. THIS IS BECAUSE OF PERSONAL PROTECTIVE EQUIPMENT, IMPLEMENTATION OF PROPER PERSONNEL PROTECTION PROCEDURES IN ACCORDANCE WITH OSHA REGULATIONS, THE DESIGN OF THE PROCESS EQUIPMENT, AND PROPER OPERATING PROCEDURES.

FOR ALTERNATIVES 4(AND 4A) AND 5(AND 5A) BUILDINGS WOULD BE DECONTAMINATED AND DEMOLISHED AND ALL CONTAMINATED SOIL TREATED WITHIN 34 MONTHS AFTER A ROD IS SIGNED. FOR ALTERNATIVE 3(AND 3A), BUILDINGS WOULD BE DECONTAMINATED AND DEMOLISHED AND ALL CONTAMINATED SOIL WOULD BE REMEDIATED WITHIN 45 MONTHS OF SIGNING A ROD.

GROUNDWATER REMEDIATION FOR ALTERNATIVES 3, 4, AND 5 WILL REQUIRE MORE THAN 30 YEARS. GROUNDWATER REMEDIATION FOR ALTERNATIVES 3A, 4A, AND 5A WILL TAKE LONGER BECAUSE OF THE ADDITIONAL TIME REQUIRED FOR DILUTION AND REMOVAL MECHANISMS TO REDUCE CONTAMINANT CONCENTRATIONS IN DOWNGRADIENT GROUND WATER TO ACCEPTABLE LEVELS. IN ADDITION, FOLLOW-UP GROUNDWATER MONITORING WOULD OCCUR FOR AN ADDITIONAL FIVE YEARS TO

VERIFY THE EFFECTIVENESS OF THE REMEDIAL ACTION PROGRAM.

ALTERNATIVES 3(AND 3A), 4(AND 4A), AND 5(AND 5A) INCORPORATE GROUNDWATER TREATMENT AND WOULD REQUIRE MORE THAN 30 YEARS TO ACHIEVE THE REMEDIAL ACTION GOALS. ALTERNATIVE 3 (AND 3A) WOULD REQUIRE THE MOST TIME TO

IMPLEMENT SOIL REMEDIATION ACTIVITIES (21 MONTHS), WHILE ALTERNATIVE 5 WOULD REQUIRE AT LEAST 12 MONTHS. DURING THE IMPLEMENTATION OF THESE ALTERNATIVES THE COMMUNITY WOULD BE PROTECTED FROM SHORT-TERM RISK BY DUST CONTROL MEASURES AND THE USE OF INSTITUTIONAL CONTROLS ON GROUNDWATER.

IMPLEMENTABILITY IS THE TECHNICAL AND ADMINISTRATIVE FEASIBILITY OF A REMEDY, INCLUDING THE AVAILABILITY OF MATERIALS AND SERVICES NEEDED TO IMPLEMENT THE CHOSEN SOLUTION. EACH OF THE ALTERNATIVES ARE TECHNICALLY FEASIBLE USING TECHNOLOGIES THAT HAVE DEMONSTRATED PRIOR PERFORMANCE, EXCEPT ALTERNATIVE 5(AND 5A), WHICH INVOLVES THE USE OF AN INNOVATIVE TECHNOLOGY.

ALTERNATIVES 3(AND 3A), 4(AND 4A) AND 5(AND 5A), WHICH INVOLVE DISCHARGE VIA POTW OR SURFACE WATER, MAY NOT BE FEASIBLE IF THE LOCAL POTW WILL NOT ACCEPT DISCHARGE FROM THE SITE AND\OR NPDES PERMITTING REQUIREMENTS CANNOT BE ACHIEVED. ALL COMPONENTS OF EACH OF THE ALTERNATIVES USE COMMERCIALLY AVAILABLE EQUIPMENT AND SERVICES.

ALTERNATIVE 1 IS TECHNICALLY THE EASIEST TO IMPLEMENT, BUT MAY NOT BE ADMINISTRATIVELY FEASIBLE BECAUSE OF THE HIGH RISKS TO PUBLIC HEALTH ASSOCIATED WITH THE CONTAMINATED SOIL, BUILDINGS AND GROUND WATER, EPA'S LEGAL REQUIREMENT AND INSTITUTIONAL COMMITMENTS TO REMEDIATE SUCH RISKS, AND THE CONCERNS OF THE PUBLIC, STATE, AND LOCAL OFFICIALS.

ALTERNATIVE 2 IS EASIER TECHNICALLY TO IMPLEMENT THAN ALTERNATIVES 3, 4, AND 5, BECAUSE IT INVOLVES NO TREATMENT TECHNOLOGY. HOWEVER IT MAY OR MAY NOT BE ADMINISTRATIVELY EASIER TO IMPLEMENT COMPARED TO ALTERNATIVES INVOLVING TREATMENT, BECAUSE OF THE CONGRESSIONALLY MANDATED PREFERENCE FOR ALTERNATIVES INVOLVING TREATMENT.

COST

THE TOTAL PRESENT WORTH COSTS FOR EACH OF THE ALTERNATIVES EVALUATED ARE AS FOLLOWS (INDIRECT COSTS INCLUDED):

ALTERNATIVE 1: $249,023
ALTERNATIVE 2: $762,406
ALTERNATIVE 3: $41,348,205
ALTERNATIVE 3A: $41,086,379
ALTERNATIVE 4: $21,924,186
ALTERNATIVE 4A: $21,679,158
ALTERNATIVE 5: $ 12,170,167
ALTERNATIVE 5A: $ 11,923,774

STATE ACCEPTANCE

EPA AND THE TENNESSEE DEPARTMENT OF HEALTH AND ENVIRONMENT (STATE OR TDHE) HAVE COOPERATED THROUGHOUT THE RI/FS PROCESS. THE STATE HAS PARTICIPATED IN THE DEVELOPMENT OF THE RI/FS THROUGH COMMENT ON EACH OF

THE PLANNING AND DECISION DOCUMENTS DEVELOPED BY EPA, NAMELY THE RI REPORT, FS REPORT, PROPOSED PLAN, AND THE DRAFT ROD AND THROUGH FREQUENT CONTACT BETWEEN THE EPA AND TDHE SITE PROJECT MANAGERS. AFTER REVIEW OF THE DRAFT ROD DATED MARCH 13, 1991 AND THE FINAL DRAFT ROD DATED JUNE 10, 1991, THE STATE GAVE ITS CONCURRENCE ON THE SELECTED REMEDY AND ITS CONTINGENCY REMEDY IN A LETTER TO EPA DATED JUNE 26, 1991 (SEE APPENDIX E). THE STATE HAS INDICATED THAT FORMAL CONCURRENCE WITH THE ABAP ROD WILL BE PROVIDED FOLLOWING ITS REVIEW OF THE FINAL DRAFT ROD.

THE STATE COMMENTED THAT IT WOULD NOT ACCEPT THE "NO ACTION" ALTERNATIVE NOR ALTERNATIVE 2. THE STATE AGREES WITH EPA THAT NEITHER ALTERNATIVE WOULD BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT. TDHE FURTHER COMMENTED THAT THESE ALTERNATIVES WERE NOT ACCEPTABLE FOR THE FOLLOWING REASONS: (1) NOT CONSISTENT WITH THE FEDERAL AND STATE PREFERENCE FOR A PERMANENT REMEDY; (2) NOT CONSISTENT WITH STATE OF TENNESSEE AQUIFER CLASSIFICATION FOR THE SITE AREA; (3) INCONSISTENT WITH NON-POINT SOURCE INITIATIVES; AND (4) IMPRACTICAL DUE TO LONG TERM MAINTENANCE REQUIRED AS RESULT OF HAZARDOUS WASTE BEING LEFT AT SITE.

THE STATE REQUESTED IN COMMENTS SUBMITTED ON THE DRAFT ROD THAT IT AND EPA MUTUALLY CONCUR PRIOR TO EPA GRANTING AN ARAR WAIVER ON THE BASIS OF TECHNICAL IMPRACTICABILITY. STATE ARARS IDENTIFIED BY TDHE ARE LISTED IN SECTION 10.2.

COMMUNITY ACCEPTANCE

EPA RECEIVED NO FORMAL COMMENTS FROM THE RESIDENTS COMPRISING THE COMMUNITY OF ARLINGTON, TENNESSEE DURING THE PUBLIC COMMENT PERIOD. HOWEVER, DURING THE PUBLIC MEETING HELD ON JANUARY 24, 1991 THOSE TOWN RESIDENTS IN ATTENDANCE EXPRESSED SUPPORT FOR THE SELECTED REMEDY PRESENTED BY EPA. DURING THE CONDUCT OF THE RI/FS, TOWN RESIDENTS FREQUENTLY STATED TO EPA PERSONNEL, DURING VISITS TO THE SITE, THAT THEY WOULD LIKE THE SITE CLEANED UP.

EPA DID RECEIVE COMMENTS AT THE CLOSE OF THE EXTENDED PUBLIC COMMENT PERIOD FROM IDENTIFIED SITE PRP'S WHO HAVE CHOSEN TO REFER TO THEMSELVES COLLECTIVELY AS THE "INTERESTED PARTIES". THE "INTERESTED PARTIES" NOTIFIED EPA THAT IT WANTED TO DISCUSS THE DEVELOPMENT OF A WORK PLAN TO CONDUCT ANOTHER RI/FS AT THE SITE. THE "INTERESTED PARTIES" COMMENTED THAT THEY FELT THAT THE EPA FEDERALLY FUNDED RI/FS CONTAINED "NUMEROUS ERRORS IN DATA COLLECTION, METHODOLOGY, AND ANALYSIS" AND FURTHER, THAT "ANY REMEDY" SELECTED BASED ON THE EPA RI/FS WOULD BE "ARBITRARY AND CAPRICIOUS AND INCONSISTENT WITH THE NATIONAL CONTINGENCY PLAN." EPA HAS RESPONDED TO THE COMMENTS RAISED AND QUESTIONS POSED IN THE "INTERESTED PARTIES'" TECHNICAL COMMENTS ON THE FINAL RI/FSS FOR THE

ARLINGTON BLENDING AND PACKAGING SITE IN THE ATTACHED RESPONSIVENESS SUMMARY.

#SR

THE SELECTED REMEDY

THE SELECTED REMEDY, ALTERNATIVE 5, INVOLVES THE USE OF THE INNOVATIVE TECHNOLOGY, THERMAL DESORPTION. EPA HAS SELECTED THIS REMEDY BASED UPON CONSIDERATION OF THE REQUIREMENTS OF CERCLA AND THE DETAILED ANALYSIS OF THE ALTERNATIVES. THIS THERMAL TREATMENT METHOD WILL SEPARATE ORGANIC CONTAMINANTS FROM SITE SOILS AND DEBRIS THROUGH VAPORIZATION AT TEMPERATURES OF UP TO 800 DEGREES F. THOUGH THE CONTAMINANTS WOULD NOT BE DESTROYED, THE OFF-GASES WOULD BE CONDENSED AND THE RESULTING LIQUIDS WOULD BE TREATED BY ACTIVATED CARBON COLUMNS. THE COLLECTED CONDENSATES AND PRECIPITATES WILL BE TREATED BEFORE OFF-SITE DISPOSAL.

AN ESTIMATED 24,000 YD3 OF CHLORINATED HYDROCARBONS CONTAMINATED SOILS, NAMELY PESTICIDES, WILL BE EXCAVATED AT THE SITE. THESE SOILS ARE MAINLY LOCATED AROUND THE PERIMETER OF THE FORMER PROCESS BUILDINGS, G AND E, AND ADJACENT AREAS THAT RECEIVED SURFACE WATER RUN-OFF FROM HOT SPOTS WHERE SPILLS OCCURRED. THE VERTICAL EXTENT OF PESTICIDE CONTAMINATION IS APPROXIMATELY 12 FEET. ONCE TREATED, THE SOILS WILL BE BACKFILLED, ON SITE, IN THE EXCAVATION CELLS, REGRADED, AND REVEGETATED. THOSE SOILS CONTAINING TRACE METALS IN EXCESS OF SOILS ACTION LEVELS WILL BE SOLIDIFIED, ON-SITE, AND DISPOSED OF IN AN OFF-SITE FACILITY.

GROUND WATER WILL BE EXTRACTED VIA APPROXIMATELY 15 EXTRACTION WELLS. THESE WELLS WILL BE SPACED APPROXIMATELY 200 FEET APART ON A LINE RUNNING PERPENDICULAR TO THE SOUTHERN BOUNDARY OF THE SITE, WITH THE FIRST WELL LOCATED NEAR THE CSX RAILROAD. THE EXTRACTION SYSTEM WOULD HAVE A COMBINED FLOW RATE OF 30 GALLONS PER MINUTE (GPM).

GROUND WATER WOULD BE PUMPED FROM THE EXTRACTION WELLS THROUGH BURIED POLYETHYLENE PIPING TO A RUN TANK IN THE TREATMENT FACILITY. THE RUN TANK SERVES AS BOTH A REGULATOR FOR VARIED INFLUENT FLOW AND A REPOSITORY FOR BACKWASH EFFLUENT. FROM THE FIRST RUN TANK, WATER IS PUMPED THROUGH A DUAL SECTION SANDFILTER. THE SANDFILTER REMOVES SUSPENDED SOLIDS VIA MECHANICAL FILTERING. THE PURPOSE OF THE DUAL SECTION SANDFILTER IS TO PREVENT TEMPORARY SYSTEM SHUTDOWN DURING A BACKWASH CYCLE. THE SANDFILTER IS BACKWASHED PERIODICALLY TO REMOVE ACCUMULATED SEDIMENT.

AFTER THE CARBON ADSORPTION UNITS HAVE REACHED THEIR CAPACITY FOR ADSORBING ORGANIC IMPURITIES, THE CARBON GRANULES CAN BE REGENERATED THROUGH OFF-SITE REACTIVATION. ALTERNATELY, DISPOSABLE CARBON CANISTERS CAN BE USED AND THEN PROPERLY DISCARDED. EFFLUENT FROM THE CARBON ADSORPTION UNITS WOULD BE DISCHARGED TO THE LOOSAHATCHIE RIVER CANAL OR LOCAL POTW IN COMPLIANCE WITH NPDES OR FACILITY PRETREATMENT REQUIREMENTS.

REMEDIATION GOALS

THE GOALS OF THE REMEDIAL ACTION ARE: (1) TO REDUCE THE RISKS ASSOCIATED WITH LONG-TERM EXPOSURE TO CONTAMINATED ON-SITE AND OFF-SITE SOILS; (2)

TO PREVENT FUTURE INGESTION OF POTENTIALLY CONTAMINATED GROUND WATER; (3) TO REDUCE MIGRATION OF CONTAMINANTS BETWEEN SITE SOILS AND GROUNDWATER; (4) TO RESTORE GROUND WATER IN THE UNIT II AQUIFER TO DRINKING WATER QUALITY; AND (5) TO REDUCE OFF-SITE CONTAMINANT MIGRATION THROUGH THE GROUNDWATER PATHWAY. REMEDIATION OF THE SITE IS BASED ON RISK-BASED CLEANUP LEVELS THAT WOULD SIGNIFICANTLY REDUCE ENDANGERMENT TO PUBLIC HEALTH AND THE ENVIRONMENT AND ACHIEVE LEVELS MANDATED BY APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS) FOR THE SITE.

CLEANUP LEVELS FOR SOIL AND SEDIMENT WERE BASED ON TWO CRITERIA: (1) TO REDUCE THE INGESTION AND DERMAL CONTACT RISKS TO (10-5) TO (10-6); AND (2) TO PROTECT GROUND WATER AND SURFACE WATER FROM CONTAMINANTS MIGRATING FROM THE SOIL.

SURFACE SOIL AND SEDIMENT CLEANUP LEVELS WERE DERIVED FROM RISK CALCULATIONS BASED ON BOTH ORAL INGESTION OF AND DERMAL EXPOSURE TO CONTAMINANTS OF CONCERN FOUND IN SITE SOILS. A MORE THOROUGH DESCRIPTION OF THE DERIVATION OF THE SURFACE CLEANUP LEVELS IS PRESENTED IN CHAPTER 6 OF THE RI REPORT. A LEACHATE MODEL, AS DESCRIBED IN CHAPTER 5 OF THE RI REPORT, WAS DEVELOPED TO ESTIMATE THE SUBSURFACE SOIL CLEANUP LEVELS NECESSARY TO PROTECT THE GROUND WATER FROM CONTAMINATED LEACHATE CONTAINING THE GROUNDWATER CONTAMINANTS OF CONCERN. THE MORE CONSERVATIVE OF THE TWO CLEANUP LEVELS FOR EACH CONTAMINANT WAS SELECTED AS THE REMEDIAL GOAL.

THE REMEDIATION GOALS FOR SOIL AND SEDIMENT CONTAMINANTS OF CONCERN ARE LISTED IN TABLE 9.1. THIS TABLE SUMMARIZES THE SOIL ACTION LEVELS SELECTED FOR THE SITE ON THE BASIS OF BOTH DIRECT RISK EXPOSURE (TABLE 9.2) AND GROUNDWATER PROTECTION (TABLE 9.3). THE MORE CONSERVATIVE OF THE TWO CONCENTRATION LEVELS FOR A GIVEN SOIL CONTAMINANT WAS SELECTED FOR BOTH ON-SITE AND OFF-SITE SOILS, EXCEPT ARSENIC. ARSENIC TYPICALLY MAY BE FOUND IN BACKGROUND SOILS AT DOUBLE-DIGIT MG/KG LEVELS. IN ADDITION, EVIDENCE FOR ITS ESSENTIAL-ELEMENT STATUS AT LOW DOSAGES AND ITS LIKELY THRESHOLD TOXIC RESPONSE IN HUMANS SUGGEST THAT THE CONCENTRATIONS MAY BE OVERLY CONSERVATIVE. THE SURFACE SOIL CLEANUP LEVEL FOR ARSENIC WAS CHOSEN WITH THESE FACTORS IN MIND. THE APPROXIMATE VOLUME OF SOIL ABOVE THE LEVELS REQUIRING REMEDIATION IS 24,000 CUBIC YARDS.

SOIL CLEANUP LEVELS FOR DIRECT EXPOSURE TO SITE SOILS

TABLE 9.2 PRESENTS THE SURFICIAL SOIL CLEANUP LEVELS FOR THE CONTAMINANTS OF CONCERN FOR THREE LEVELS IN THE RISK RANGE, I.E., (10-4), (10-5), AND (10-6). THESE LEVELS WERE DERIVED USING THE ORAL

AND DERMAL EXPOSURE ASSUMPTIONS (TABLE 6.4 AND TABLE 6.5) UTILIZED IN THE EQUATION SHOWN IN FIGURE 9.1, TO CALCULATE THE RESIDENT UPPERBOUND RISKS FOR CONTAMINANTS AT THE SITE.

FIGURE 9.2 SHOWS THE GRID AREAS THAT EXCEED A CHLORDANE ACTION LEVEL OF

1 MG/KG FOR OFF SITE AREAS AND 10 MG/KG FOR ON-SITE AREAS. THESE LEVELS REPRESENT A (10-6) RISK LEVEL IN CURRENT RESIDENTIAL AREAS AND A (10-5) RISK LEVEL FOR SURFACE SOILS WITHIN THE FENCED AREA FOR POTENTIAL FUTURE RESIDENT CHILDREN. THE REMEDIATION OF SURFACE SOIL TO THESE LEVELS OF CHLORDANE WILL REDUCE THE TOTAL RISK FROM DIRECT EXPOSURE TO ALL SITE CONTAMINANTS TO ACCEPTABLE LEVELS.

SOIL CLEANUP LEVELS FOR GROUNDWATER PROTECTION

CALCULATIONS OF THE SOIL CLEANUP LEVELS NECESSARY TO ASSURE GROUNDWATER PROTECTION ARE PRESENTED IN TABLE 9.3. THESE SOIL CLEANUP LEVELS ARE BASED ON A COMPOSITE APPROACH THAT RELIES ON BOTH EMPIRICAL DATA AND MODEL ANALYSIS. IT ACCOUNTS FOR THE FACT THAT PESTICIDE CONTAMINANTS IN SOILWATER PERCOLATING OUT OF THE UPPER ONE FOOT OF SOIL (THE MOST CONTAMINATED ZONE) ARE PARTIALLY ATTENUATED ON SOIL MATERIAL BETWEEN THE ONE FOOT DEPTH AND THE WATER TABLE. THE ASSUMPTION WAS MADE THAT CONTAMINANTS IN THE SATURATED ZONE WILL INITIALLY HAVE PERCOLATED OUT OF THE UPPER 1 FOOT OF THE SITE SURFACE SOILS INTO THE LOWER SATURATED ZONE. FIGURE 9.3 DEPICTS THE APPROXIMATE AREAL EXTENT OF SUBSURFACE SOILS REQUIRING REMEDIATION.

GROUNDWATER CLEANUP LEVELS

THE GOAL OF THIS PART OF THE REMEDIAL ACTION IS TO RESTORE THE GROUND WATER TO ITS BENEFICIAL USE, WHICH IS, AT THIS SITE, CLASS IIB, A POTENTIAL SOURCE OF DRINKING WATER. BASED ON INFORMATION OBTAINED DURING THE RI, AND THE ANALYSIS OF ALL REMEDIAL ALTERNATIVES, EPA AND THE STATE OF TENNESSEE BELIEVE THAT THE SELECTED REMEDY WILL ACHIEVE THIS GOAL. THE GROUNDWATER CONTAMINANTS OF CONCERN OR INDICATOR PARAMETERS AS LISTED IN TABLE 6.1 ARE THOSE COMPOUNDS WHICH HAVE AN MCL AND WERE DETECTED IN ONE OR MORE SAMPLES AT CONCENTRATIONS AT OR ABOVE THE MCL. GROUNDWATER REMEDIAL LEVELS AND THE RANGE OF CONCENTRATIONS DETECTED FOR EACH INDICATOR PARAMETER ARE LISTED IN TABLE 9.4.

GROUNDWATER CONTAMINATION MAY BE ESPECIALLY PERSISTENT IN THE IMMEDIATE VICINITY OF THE CONTAMINANTS' SOURCE, WHERE CONCENTRATIONS ARE RELATIVELY HIGH. THE ABILITY TO ACHIEVE CLEANUP LEVELS AT ALL POINTS THROUGHOUT THE AREA OF ATTAINMENT, OR PLUME, CANNOT BE DETERMINED UNTIL THE EXTRACTION SYSTEM HAS BEEN IMPLEMENTED, MODIFIED AS NECESSARY, AND PLUME RESPONSE MONITORED OVER TIME. IF THE SELECTED REMEDY CANNOT MEET REMEDIATION LEVELS, WHICH ARE A COMBINATION OF MCLS AND PROPOSED MCLS, AT ANY OR ALL OF THE MONITORING POINTS DURING IMPLEMENTATION, THE CONTINGENCY MEASURES AND LEVELS, DESCRIBED IN THIS SECTION, MAY REPLACE THE SELECTED REMEDY AND LEVELS. SUCH CONTINGENCY MEASURES WILL, AT A MINIMUM, PREVENT FURTHER MIGRATION OF THE PLUME AND INCLUDE A

COMBINATION OF CONTAINMENT TECHNOLOGIES (GROUNDWATER EXTRACTION AND TREATMENT) AND INSTITUTIONAL CONTROLS. THESE MEASURES ARE CONSIDERED TO BE PROTECTIVE OF HUMAN HEALTH AND THE ENVIRONMENT, AND ARE TECHNICALLY PRACTICABLE UNDER THE CORRESPONDING CIRCUMSTANCES.

THE SELECTED REMEDY WILL INCLUDE GROUND WATER EXTRACTION FOR AN ESTIMATED PERIOD OF 30 YEARS, DURING WHICH TIME THE SYSTEM'S PERFORMANCE WILL BE CAREFULLY MONITORED ON A REGULAR BASIS AND ADJUSTED AS WARRANTED BY THE PERFORMANCE DATA COLLECTED DURING OPERATION. MODIFICATIONS MAY INCLUDE ANY OR ALL OF THE FOLLOWING:

A) AT INDIVIDUAL WELLS WHERE CLEANUP LEVELS HAVE BEEN ATTAINED, PUMPING MAY BE DISCONTINUED;

B) ALTERNATING PUMPING AT WELLS TO ELIMINATE STAGNATION POINTS;

C) PULSE PUMPING TO ALLOW AQUIFER EQUILIBRATION AND ENCOURAGE ADSORBED CONTAMINANTS TO PARTITION INTO GROUND WATER; AND

D) INSTALLATION OF ADDITIONAL EXTRACTION WELLS TO FACILITATE OR ACCELERATE CLEANUP OF THE CONTAMINANT PLUME.

TO ENSURE THAT CLEANUP LEVELS CONTINUE TO BE MAINTAINED, THE AQUIFER WILL BE MONITORED AT THOSE WELLS WHERE PUMPING HAS CEASED ON AN OCCURRENCE OF AT LEAST EVERY 5 YEARS FOLLOWING DISCONTINUATION OF GROUND WATER EXTRACTION.

CONTINGENCY MEASURES FOR GROUNDWATER REMEDIAL ACTION

IF IT IS DETERMINED, ON THE BASIS OF THE PRECEDING CRITERIA AND THE SYSTEM PERFORMANCE DATA, THAT CERTAIN PORTIONS OF THE AQUIFER CANNOT BE RESTORED TO THEIR BENEFICIAL USE, ANY OR ALL OF THE FOLLOWING MEASURES INVOLVING LONG-TERM MANAGEMENT MAY BE IMPLEMENTED FOR AN INDEFINITE PERIOD OF TIME, AS A MODIFICATION OF THE EXISTING SYSTEM:

A) LOW LEVEL PUMPING WOULD BE IMPLEMENTED AS A LONG-TERM GRADIENT CONTROL, OR CONTAINMENT MEASURE;

B) CHEMICAL-SPECIFIC ARARS WOULD BE WAIVED FOR THE CLEANUP OF THOSE PORTIONS OF THE AQUIFER BASED ON THE TECHNICAL IMPRACTICABILITY OF ACHIEVING FURTHER CONTAMINANT REDUCTION;

C) INSTITUTIONAL CONTROLS WOULD BE PROVIDED/MAINTAINED TO RESTRICT ACCESS TO THOSE PORTIONS OF THE AQUIFER WHICH REMAIN ABOVE HEALTH-BASED LEVELS, SHOULD THIS AQUIFER BE PROPOSED FOR USE AS A DRINKING WATER SOURCE;

D) CONTINUED MONITORING OF SPECIFIED WELLS; AND

E) PERIODIC REEVALUATION OF REMEDIAL TECHNOLOGIES FOR GROUND WATER RESTORATION.

THE DECISION TO INVOKE ANY OR ALL OF THESE MEASURES MAY BE MADE DURING A PERIODIC PERFORMANCE EVALUATION (5 YEAR REVIEW) OF THE REMEDIAL ACTION

WHICH WILL OCCUR AT LEAST ONCE EVERY FIVE YEARS OR AT THE CONCLUSION OF REMEDIAL ACTION UNDER THIS ROD, WHICH WOULD OCCUR AFTER 30 YEARS OF GROUNDWATER REMEDIATION. SHOULD EPA DECIDE THAT AN ARAR WAIVER IS APPROPRIATE, DUE TO NON-COMPLIANCE WITH AN ARAR OR ARARS AS THE RESULT OF TECHNICAL IMPRACTICABILITY FROM AN ENGINEERING PERSPECTIVE, IT WILL NOTIFY AND SEEK TO GAIN CONCURRENCE FROM THE STATE PRIOR TO GRANTING SUCH A WAIVER PURSUANT TO CERCLA SECTIONS 121(D)(4) AND (F)(2). ALSO, AN EXPLANATION OF SIGNIFICANT DIFFERENCES WOULD BE ISSUED TO INFORM THE PUBLIC OF THE DETAILS OF THESE ACTIONS, SHOULD THEY OCCUR.

CONTINGENCY MEASURES FOR SOILS REMEDIAL ACTION

SHOULD IMPLEMENTATION OF THE THERMAL DESORPTION METHOD (ALTERNATIVE 5) PROVE INEFFECTIVE AS A SOILS REMEDIAL ACTION BY NOT MEETING SOIL CLEANUP LEVELS, ALTERNATIVE 4 WOULD BE THE AGENCY'S PREFERRED ALTERNATIVE. ALL ASPECTS OF ALTERNATIVE 4 ARE IDENTICAL TO THOSE OF ALTERNATIVE 5, INCLUDING THE METHOD USED TO REMEDIATE SITE GROUND WATER, EXCEPT THAT CONTAMINATED SOILS, SOLID WASTE FROM GROUNDWATER TREATMENT AND BUILDING DECONTAMINATION (AND DEMOLITION), AND OTHER RESIDUALS WOULD BE REMEDIATED USING ON-SITE INCINERATION.

AN ON-SITE INCINERATOR WITH A DRY SCRUBBER, BAGHOUSE, FLUX FORCE CONDENSER, A HIGH ENERGY COLLISION SCRUBBER (USING SODIUM HYDROXIDE FOR ACID NEUTRALIZATION) AND AN ENTRAINMENT SEPARATOR FOR DEMISTING IS THE THERMAL TREATMENT SYSTEM FOR ALTERNATIVE 4. THE TREATED SOIL AND SOLID WASTE WILL BE TESTED FOR RESIDUAL CONTAMINATION AND IF FOUND TO BE BELOW ACTION LEVELS, WILL BE USED AS CLEAN BACKFILL ON-SITE. THOSE SOILS CONTAINING ORGANICS IN LEVELS THAT EXCEED ACTION LEVELS WOULD BE INCINERATED AGAIN. THIS PROCESS WOULD CONTINUE UNTIL ORGANICS CONTAMINATION IN SOILS IS BELOW ACTION LEVELS. APPROPRIATE MOISTURE WOULD THEN BE ADDED TO TREATED SOILS PRIOR TO ON-SITE BACKFILLING. ALSO, LIKE ALTERNATIVE 5, THIS ALTERNATIVE INVOLVES ON-SITE SOLIDIFICATION OF SOILS WHICH CONTAIN SIGNIFICANT LEVELS OF TRACE METALS, IN EXCESS OF BACKGROUND. SOLIDIFIED SOILS WOULD BE DISPOSED OF IN AN OFF-SITE FACILITY. THE INCINERATOR AND POLLUTION CONTROL AND MATERIAL HANDLING EQUIPMENT WOULD BE SET UP WITHIN THE BOUNDARIES OF THE SITE.

FLUE GAS FROM THE FURNACE WOULD PASS THROUGH AN AFTERBURNER, WHERE COMBUSTION OF ORGANIC VAPORS WOULD TAKE PLACE, THROUGH A DRY SCRUBBER WHERE BLOWDOWN FROM THE SCRUBBER WOULD BE EVAPORATED, A BAGHOUSE, AND FINALLY THROUGH A CONVENTIONAL QUENCHER/SATURATOR FOLLOWED BY A FORCED FLUX CONDENSER.

WASTEWATER FROM THE SCRUBBER WOULD PASS THROUGH A CLARIFIER AND A

CHEMICAL ADDITION TANK WHERE ADDITIONAL CAUSTIC WOULD BE ADDED FOR HCL REMOVAL. BLOWDOWN WATER FROM THE SCRUBBER CLARIFIER SYSTEM WOULD BE TREATED USING CHEMICAL PRECIPITATION TO REMOVE ARSENIC (IF IT IS CATIONIC) AND OTHER TOXIC MATERIALS IN A CHEMICAL TREATMENT SYSTEM AND SETTLING TANK EQUIPPED WITH A CHAIN DRAG FOR SEDIMENT REMOVAL. THE

PRECIPITATED SOLIDS WOULD ALSO BE FED INTO THE CEMENT MILL, WITH FLY ASH AND GROUND BOTTOM ASH TO MAKE CONCRETE BLOCKS. THE TREATED WATER WOULD BE RETURNED TO THE SCRUBBER AND TO THE ASH QUENCH SYSTEM AND USED FOR SOLIDIFICATION. SOME EXCESS BLOWDOWN WATER WOULD BE TREATED BY DISTILLATION IN THE FLUE GAS SPRAY DRYER.

DECONTAMINATION FLUIDS WOULD BE COLLECTED SEPARATELY AT THE SITE. THESE LIQUID WASTES WOULD BE TESTED, TREATED IN THE CLARIFIER USED FOR THE SCRUBBER WATER AND USED IN THE SCRUBBING PROCESS. ONCE INCINERATION ACTIVITIES WERE COMPLETED, REMAINING WASTE WATER WOULD BE DISPOSED OF THROUGH THE GROUND WATER TREATMENT SYSTEM AND DISCHARGED TO THE LOOSAHATCHIE RIVER CANAL OR THE LOCAL POTW, AFTER VERIFICATION THAT IT MEETS APPLICABLE CRITERIA FOR DISCHARGE. PILOT-SCALE TESTING WOULD BE NECESSARY PRIOR TO IMPLEMENTATION OF FULL-SCALE TREATMENT ON-SITE TO DETERMINE PRIMARY DESIGN REQUIREMENTS.

ALTERNATIVE 4, LIKE ALTERNATIVE 5, UTILIZES A THERMAL TREATMENT TO REMEDIATE CONTAMINATED SITE SOILS, BUT ALTERNATIVE 4 WOULD INVOLVE THE USE OF AN ON-SITE INCINERATOR WHICH WOULD DESTROY THE ORGANICS PRESENT IN SITE SOILS AND IDENTIFIED SOLID WASTES RATHER THAN CAUSE A PHYSICAL SEPARATION OF ORGANICS FROM THE SOILS. THE USE OF THERMAL TREATMENT OF SOILS WILL ENSURE THAT CONTAMINANT LEVELS ARE PERMANENTLY REDUCED, THUS ELIMINATING A CURRENT SOURCE OF GROUNDWATER CONTAMINATION. BOTH ALTERNATIVES WOULD UTILIZE RESTRICTIONS ON LAND AND GROUNDWATER USE DURING SITE REMEDIATION PERIODS. TABLES 9.5 AND 9.6 PROVIDE A BREAKDOWN OF THE COST ESTIMATES FOR ALTERNATIVE 5 AND ALTERNATIVE 5A, RESPECTIVELY.

#SD
STATUTORY DETERMINATIONS

PROTECTION OF HUMAN HEALTH AND ENVIRONMENT

ALTERNATIVES 4 AND 5 PROVIDE APPROXIMATELY THE SAME OVERALL PROTECTION TO THE HEALTH OF INDIVIDUALS AND TO THE ENVIRONMENT (CANCER RISKS FROM EXPOSURE TO SOIL OF LESS THAN 1 X (10-5) FOR ON-SITE SOILS AND 1 X (10-6) FOR OFF-SITE SOILS, NO SIGNIFICANT RISKS OF THRESHOLD TOXIC EFFECTS UNDER MAXIMUM PLAUSIBLE EXPOSURE, AND NO SIGNIFICANT RISK (HI LESS THAN 1) OF ADVERSE EFFECTS ON THE ENVIRONMENT). THE BASELINE RISK ASSESSMENT CONCLUDED THAT THE PRIMARY HEALTH RISKS POSED BY THE SITE WERE DUE TO LONG TERM EXPOSURE TO BOTH CONTAMINATED SURFACE SOILS AND TO THE INGESTION OF GROUND WATER, BOTH BENEATH AND DOWNGRADIENT OF THE SITE.

BOTH ALTERNATIVES 4 AND 5 INVOLVE ON-SITE THERMAL TREATMENT OF SOILS CONTAMINATED WITH ORGANICS AND LONG-TERM PUMP AND TREAT MEASURES TO REDUCE CONTAMINANTS IN SITE GROUND WATER. EXCAVATION AND SUBSEQUENT THERMAL TREATMENT OF THE SURFACE AND SUBSURFACE SOILS WILL PREVENT HUMAN CONTACT AND ALSO ELIMINATE THE PROBABLE SOURCE FOR GROUNDWATER

CONTAMINATION DUE TO LEACHING. GROUND WATER USE RESTRICTIONS WILL BE IMPOSED DURING THE GROUNDWATER REMEDIATION UNTIL HEALTH BASED LEVELS HAVE BEEN RESTORED.

IMPLEMENTATION OF ALTERNATIVES 4 AND 5 WOULD IMPACT THE RESIDENTIAL COMMUNITY AND WORKERS ADJACENT TO THE SITE DUE TO THE ON-SITE ACTIVITIES RESULTING FROM OPERATION OF THERMAL TREATMENT AND SOLIDIFICATION FACILITIES, THE INCREASED TRAFFIC IN SUPPORT OF REMEDIATION ACTIVITIES AND POSSIBLE FUGITIVE EMISSIONS. ADVERSE IMPACTS TO PUBLIC HEALTH AND TO THE ENVIRONMENT AS THE RESULT OF THESE ALTERNATIVES ARE FELT TO BE INSIGNIFICANT.

COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

BOTH ALTERNATIVES 4 AND 5 ATTAIN ALL ARARS THAT HAVE BEEN IDENTIFIED AS APPLICABLE TO ACTIONS THAT WOULD OCCUR AS THE RESULT OF IMPLEMENTATION OF THE SELECTED REMEDIAL ACTION. THE FOLLOWING ARE MAJOR APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS), RISK-BASED LEVELS, AND OTHER "TO BE CONSIDERED" (TBCS) BEING MET/UTILIZED FOR THE SPECIFIC COMPONENTS OF THE REMEDIAL ALTERNATIVE:

CONTAMINANT-SPECIFIC ARARS

THE SAFE DRINKING WATER ACT (SDWA) PROMULGATED NATIONAL PRIMARY DRINKING WATER STANDARD MAXIMUM CONTAMINANT LEVELS (MCLS) (40 CFR PART 141) FOR THE FOLLOWING CONTAMINANTS: (1) BENZENE; (2) CHLORDANE; (3) CHROMIUM; (4) 1,1-DCE; (5) ENDRIN; (6) HEPTACHLOR EPOXIDE; AND (7) SELENIUM.

THE CLEAN AIR ACT (CAA) CONSISTS OF THREE PROGRAMS FOR REQUIREMENTS THAT MAY BE ARARS: NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS) (40 CFR PART 50), NATIONAL EMISSIONS STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS) (40 CFR PART 61), AND NEW SOURCE PERFORMANCE STANDARDS (NSPS) (40 CFR PART 60).

LOCATION-SPECIFIC ARARS

RCRA SUBTITLE C REGULATES THE TREATMENT, STORAGE, AND DISPOSAL OF HAZARDOUS WASTE FROM GENERATION THROUGH ULTIMATE DISPOSAL.

LAND DISPOSAL RESTRICTION (40 CFR PART 268) THE HAZARDOUS AND SOLID WASTE AMENDMENTS (HSWA), SIGNED ON NOVEMBER 8, 1984, INCLUDE SPECIFIC PROVISIONS RESTRICTING THE LAND DISPOSAL OF RCRA HAZARDOUS WASTES.

DELISTING RCRA WASTES (40 CFR 260.20 AND .22) OUTLINES THE PROCEDURES FOR DELISTING RCRA WASTES FOR AN OFF-SITE CERCLA RESPONSE ACTION.

STANDARDS APPLICABLE TO TRANSPORTERS OF HAZARDOUS WASTE (40 CFR PART 263) ARE APPLICABLE TO OFF-SITE TRANSPORTATION OF HAZARDOUS WASTE FROM THE ARLINGTON BLENDING SITE.

STANDARDS FOR OWNERS AND OPERATORS OF HAZARDOUS WASTE TREATMENT, STORAGE AND DISPOSAL FACILITIES (TSDFS) (40 CFR PART 264) ARE APPLICABLE TO REMEDIAL ACTIONS TAKEN AT THE SITE AND TO OFF-SITE FACILITIES RECEIVING HAZARDOUS WASTE FROM THE SITE FOR TREATMENT AND/OR DISPOSAL AND HAVE A RCRA PART B PERMIT IF THE SITE IS NOT A FEDERALLY ORDERED CERCLA CLEANUP.

DOT RULES FOR HAZARDOUS MATERIALS TRANSPORT (49 CFR PARTS 107 AND 171-179) REGULATE THE TRANSPORT OF HAZARDOUS MATERIALS, INCLUDING PACKAGING, TRANSPORT EQUIPMENT, AND PLACARDING.

THE CLEAN WATER ACT (CWA), AS AMENDED, GOVERNS POINT-SOURCE DISCHARGES THROUGH THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES), DISCHARGE OR DREDGE OR FILL MATERIAL, AND OIL AND HAZARDOUS WASTE SPILLS TO US WATERS.

TENNESSEE WATER QUALITY CRITERIA CONTROL ACT, TENNESSEE CODE SECTIONS 69-3-104, (1) CHAPTER 1200-4-3; USED TO DETERMINE THE PERMISSIBLE CONDITIONS OF WATERS WITH RESPECT TO POLLUTION AND PREVENTIVE OR CORRECTIVE MEASURES REQUIRED TO CONTROL POLLUTION IN VARIOUS WATERS AND (2) CHAPTER 1200-4-6-05; USE TO CLASSIFY GROUND WATER AND WATER QUALITY STANDARDS:

"TO BE CONSIDERED" (TBCS)

PRIMARY DRINKING WATER STANDARD PROPOSED MAXIMUM CONTAMINANT LEVELS (PROPOSED MCLS) FOUND IN THE MAY 22, 1989 FEDERAL REGISTER FOR THE FOLLOWING: (1) PENTACHLOROPHENOL; (2) TOLUENE; AND (3) XYLENES:

REFERENCE DOSE (RFD), IS AN ESTIMATE (WITH UNCERTAINTY SPANNING PERHAPS AN ORDER OF MAGNITUDE) OF A DAILY EXPOSURE TO THE HUMAN POPULATION (INCLUDING SENSITIVE SUBGROUPS) THAT IS LIKELY TO BE WITHOUT AN APPRECIABLE RISK OF DELETERIOUS EFFECTS DURING A LIFETIME. INTERIM FINAL RISK ASSESSMENT GUIDANCE FOR SUPERFUND (HUMAN HEALTH EVALUATION MANUAL PART A.

EPA HEALTH ADVISORIES GUIDELINES DEVELOPED BY THE EPA OFFICE OF DRINKING WATER FOR CHEMICALS THAT MAY BE INTERMITTENTLY ENCOUNTERED IN PUBLIC WATER SUPPLY SYSTEMS.

EPA AMBIENT WATER QUALITY CRITERIA (AWQC) ARE GUIDELINES THAT WERE DEVELOPED FOR POLLUTANTS IN SURFACE WATERS PURSUANT TO SECTION 304(A)(1) OF THE CLEAN WATER ACT.

CARCINOGENIC POTENCY FACTORS (CPFS) ARE USED FOR ESTIMATING THE LIFETIME

PROBABILITY (ASSUMED 70-YEAR LIFESPAN) OF HUMAN RECEPTORS CONTRACTING CANCER AS A RESULT OF EXPOSURE TO KNOWN OR SUSPECTED CARCINOGENS. INTERIM FINAL RISK ASSESSMENT GUIDANCE FOR SUPERFUND (HUMAN HEALTH EVALUATION MANUAL PART A.

EPA'S GROUNDWATER PROTECTION STRATEGY (EPA, 1984) POLICY IS TO RESTORE GROUND WATER TO ITS BENEFICIAL USES WITHIN A TIME FRAME THAT IS REASONABLE. GROUND WATER BENEATH AND ADJACENT TO THE ARLINGTON BLENDING SITE IS CLASSIFIED AS A CLASS II A AQUIFER.

RCRA GUIDANCE MANUAL FOR SUBPART G, CLOSURE AND POST CLOSURE STANDARDS (VOLUMES I-V OF THE EPA HAZARDOUS WASTE INCINERATOR GUIDANCE SERIES) EPA-530-SW78-010.

COST-EFFECTIVENESS

BOTH THE SELECTED REMEDY, ALTERNATIVE 5, AND THE CONTINGENCY REMEDY, ALTERNATIVE 4, WERE CHOSEN BECAUSE THEY PROVIDED THE BEST BALANCE AMONG THE CRITERIA USED TO EVALUATE THE ALTERNATIVES CONSIDERED IN THE DETAILED ANALYSIS. THESE ALTERNATIVES WERE FOUND TO ACHIEVE BOTH ADEQUATE PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT AND TO MEET THE STATUTORY REQUIREMENTS OF SECTION 121 OF CERCLA. THE COSTS OF ALTERNATIVES 5 AND 4, INCLUDING INDIRECT COSTS AT 28 PERCENT AND 22 PERCENT OF THEIR PRESENT WORTH CAPITAL COSTS, ARE $12,170,200 AND $21,924,100, RESPECTIVELY.

UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES OR RESOURCE RECOVERY TECHNOLOGIES TO THE MAXIMUM EXTENT PRACTICABLE

ALTERNATIVE 4 AND ALTERNATIVE 5 BOTH UTILIZE A THERMAL TREATMENT TO REMEDIATE CONTAMINATED SITE SOILS. THE SELECTED REMEDY, ALTERNATIVE 5, WOULD REMOVE ORGANIC CONTAMINATION FROM SITE SOILS BY VOLATILIZATION TO ACHIEVE PHYSICAL SEPARATION, WHILE ALTERNATIVE 4 WOULD INVOLVE THE USE OF AN ON-SITE INCINERATOR WHICH WOULD DESTROY THE ORGANICS PRESENT IN SITE SOILS AND IDENTIFIED SOLID WASTES. THE USE OF THERMAL TREATMENT OF SOILS WILL ENSURE THAT CONTAMINANT LEVELS ARE PERMANENTLY REDUCED, THUS ELIMINATING A CURRENT SOURCE OF GROUNDWATER CONTAMINATION. BOTH ALTERNATIVES WOULD UTILIZE CARBON TREATMENT OF EXTRACTED GROUND WATER TO REMOVE CONTAMINANTS THAT ARE PRESENT.

USE OF THERMAL TREATMENT AND CARBON TREATMENT WOULD PERMANENTLY REDUCE THE VOLUME, TOXICITY, AND MOBILITY OF CONTAMINANTS IN BOTH GROUND WATER AND SOILS AT THE SITE. SIMILARLY, ALTERNATIVES 4 AND 5 WOULD PROVIDE FOR LONG-TERM PROTECTION AGAINST EXPOSURE TO SITE CONTAMINANTS.

PREFERENCE FOR TREATMENT AS A PRINCIPLE ELEMENT

BOTH ALTERNATIVES INCORPORATE THE USE OF TREATMENT TECHNOLOGIES TO REMEDIATE CONTAMINATED MEDIA AT THE SITE AS A MEANS OF REDUCING TO THE

EXTENT PRACTICABLE THE PRINCIPLE THREATS TO FUTURE LONG TERM CONTACT THROUGH DERMAL EXPOSURE TO AND INGESTION OF CONTAMINATED SITE MEDIA.

#TA

TABLE 6.1
CONTAMINANTS OF CONCERN BY ENVIRONMENTAL MEDIA
ARLINGTON BLENDING AND PACKAGING SITE
ARLINGTON, TENNESSEE

CONSTITUENT	SOIL	SEDIMENT	GROUND WATER
ARSENIC	X		
BENZENE			X
CHLORDANE	X	X	X
1,1-DICHLOROETHENE			X
ENDRIN			X
HEPTACHLOR	X		
HEPTACHLOR EPOXIDE			X
PENTACHLOROPHENOL	X		X

TABLE 6.3
HEALTH-BASED VALUES FOR CARCINOGENS (CPF) AND
NON-CARCINOGENS (RFD) AND ARARS FOR
ORAL EXPOSURE TO CONTAMINANTS OF CONCERN AT THE
ARLINGTON BLENDING & PACKAGING SITE
ARLINGTON, TENNESSEE

CONTAMINANT	CPF (MG/KG/DAY)(-1)	RFD (MG/KG/DAY)	ARAR(A) (MG/L)
ARSENIC	1.8	0.001	0.05
BENZENE	0.029	NA	0.005
CHLORDANE	1.3	0.00006	0.002
CHROMIUM(VI)	NA	0.005	0.1
DICHLOROETHENE(1,1)	0.6	0.009	0.007
ENDRIN	NA	0.0003	0.002
HEPTACHLOR	4.5	0.005	0.0004
HEPTACHLOR EPOXIDE	9.1	0.000013	0.0002
PENTACHLOROPHENOL	0.12	0.03	0.001(B)
SELENIUM	NA	NA	0.05

A = FOR DRINKING WATER EXPOSURE ONLY, EPA PROMULGATED OR PROPOSED MCLS
B = PROPOSED MCL (1/30/91)
NA = NOT APPLICABLE OR NOT DETERMINED

TABLE 9.3
SOIL CLEANUP LEVELS FOR
GROUNDWATER PROTECTION
ARLINGTON BLENDING & PACKAGING SITE
ARLINGTON, TENNESSEE

COMPOUND	SURFACE SOIL CLEANUP LEVEL	DEEP SOIL CLEANUP LEVEL
CHLORDANE	17 PPM	3.3 PPM
ENDRIN	2.7 PPM	0.61 PPM
PENTACHLOROPHENOL	0.64 PPM	0.64 PPM

GROUNDWATER REMEDIATION LEVELS
ARLINGTON BLENDING & PACKAGING SITE
ARLINGTON, TENNESSEE

CONTAMINANT	GROUNDWATER(A) CONCENTRATION RANGE (PICOGRAM/L)	CLEANUP LEVEL (PICOGRAM/L)
BENZENE	0.67 - 7.95	5.0(D)
CHLORDANE(B)	0.20 - 28.6	2.0(D)
1,1-DICHLOROETHENE	1.2 - 26	7.0(D)
ENDRIN	0.084 - 0.63	0.2(D)
HEPTACHLOR EPOXIDE	0.05 - 0.20	
0.2(D)/0.04(E)		
PENTACHLOROPHENOL	2.2 - 1200	1.0(C)
TOLUENE	0.76 - 10	2,000(C)
XYLENES	9.5 - 81	10.000(C)

NOTES: A = DETECTED VALUES ONLY
B = CHLORDANE IS CONSIDERED A COMBINATION OF THE FOLLOWING: CHLORDENE, ALPHA-CHLORDANE, GAMMA-CHLORDANE, 1-HYDROXYCHLORDANE, GAMMA-CHLORDANE, TRANS-NONACHLOR, ALPHA-CHLORDENE, BETA-CHLORDENE, GAMMA-CHLORDENE, HEPTACHLOR, CIS-NONACHLOR, AND TRANS-NONACHLOR
C = PROPOSED MCL
D = CURRENT MCL
E = HEALTH-BASED CLEAN-UP LEVELS